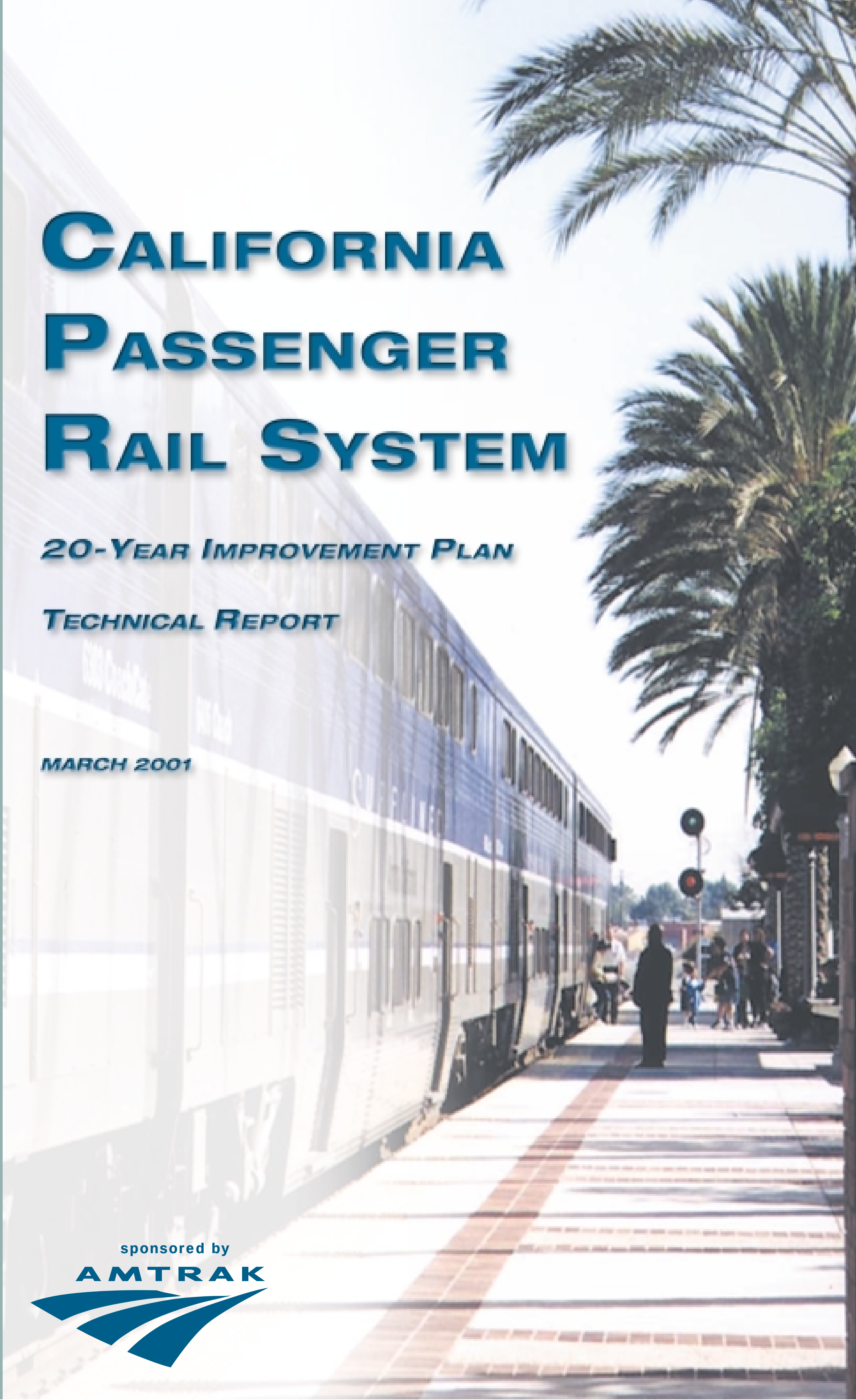

# California Passenger Rail System

## 20-Year Improvement Plan

## Technical Report

March 2001

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# OVERVIEW OF THE PLAN

## Purpose and Need

Communities across the state are identifying traffic congestion as one of the greatest obstacles to continued prosperity and improved quality of life. California is recognized nationally as a leader in formulating transportation policy and infrastructure investment. The state's transportation network is at a crossroads – California's transportation demand has exceeded capacity. The Texas Transportation Institute ranks the Los Angeles region as the most congested in the country. The San Francisco Bay Area and the San Diego region are in the top ten of the most congested regions and San Jose and San Bernadino-Riverside are ranked 15th and 16th most congested regions, respectively.[1] The state must improve the transportation system to keep pace with the current and projected growth caused by the dynamic economy and projected population increase. This can only be achieved by providing the necessary infrastructure and services to move people and goods efficiently and effectively.

Congestion is not limited to highways and airports. California's rail network faces growing congestion along rail corridors, hindering passenger and freight railroads' ability to expand service. Improvements to the state's rail system are realistic solutions to expanding travel capacity for passengers and freight in congested transportation and economic corridors. Rail improvements represent a cost-effective means for enhancing and expanding the statewide transportation network.

## California Passenger Rail System Planning Project

Amtrak is finalizing a major community-based planning initiative that identifies rail corridor needs for the statewide rail network. This planning process aims to achieve a statewide consensus on passenger rail planning, enhance a complementary relationship between growing passenger and freight rail services and promote sustained sources of funding for rail corridor development. This final product is a document that:

- Describes the 20-year vision of each corridor in terms of service expansion, increased speeds up to 110 miles per hour (mph) (and potentially up to 125 mph), trip time, operational reliability, capacity and ridership
- Lists the improvements to achieve the corridor's goal
- Identifies required funding for infrastructure and rolling stock at the project and corridor level

Amtrak has created four task forces, one for each intercity corridor (*Capitol, Pacific Surfliner*, *San Joaquin* and *Coast*). The membership of each task force includes local elected officials, Caltrans, metropolitan planning organizations, commuter railroads, freight railroads and the Federal Railroad Administration (FRA).

This 20-Year Plan addresses the following objectives:

- Identify and prioritize rail improvements that contribute to the greatest return on investment for achieving improved capacity, trip times and operational reliability in the next twenty years.
- Develop and implement a statewide rail blueprint that will guide future planning and investment decisions in the immediate, near- and long-term.

[1] *Annual Mobility Report,* Texas Transportation Institute, November 1999.

- Optimize the integration of all passenger rail services, allowing for seamless transfers.
- Create a vision statement that represents a local, regional and statewide perspective for rail transportation improvements.
- Capitalize on current opportunities at the state and federal levels to fund the near-term rail improvements.

### RESULTS

The 20-Year Plan calls for the following results:

- 21 additional intercity roundtrips
- Service increases that include:
  - Hourly service between San Diego and Los Angeles
  - Expanded San Joaquin service to Sacramento via additional trains
  - Hourly service between San Jose and Sacramento
  - Expanded service to the state's fastest-growing regions
  - Corridor service connecting downtown Los Angeles and downtown San Francisco
- Faster trip times on all corridors
- Increased speeds (90, 110 and 125 mph where appropriate)
- 300 percent increase in intercity rail ridership (exclusive of commuter rail ridership)
- Shared investments/shared benefits derived from passenger and freight rail owners and operators working in a coordinated and cooperative manner to improve service, reliability and safety
- Protected competitiveness of the ports by extending the benefits of improvements like the Alameda Rail Corridor
- Rail improvements designed with community standards in mind for improved safety, aesthetics and mobility
- For California's communities, provides enhanced grade crossing safety as well as better mobility
- Preservation of environmental resources including improved air quality and less reliance on natural energy sources.

To accomplish this, Amtrak and the planning partners have built upon prior planning efforts and the ongoing planning of the rail service providers and planning agencies statewide. These partners in planning include:

- Altamont Commuter Express (ACE)
- The Burlington Northern & Santa Fe Railway (BNSF)
- California Department of Transportation (Caltrans)
- California High-Speed Rail Authority (CA HSRA)
- Peninsula Corridor Joint Powers Board (PCJPB)
- Capitol Corridor Joint Powers Authority (CCJPA)
- Coast Rail Coordinating Council (CRCC)
- North County Transit District (NCTD)
- San Joaquin Valley Rail Committee (SJVRC)
- Santa Clara Valley Transportation Authority (VTA)
- Southern California Intercity Rail Group (SCIRG)
- Southern California Regional Rail Authority (SCRRA)
- Transportation Agency for Monterey County (TAMC)
- Union Pacific Railroad (UPRR)

Amtrak and its partners established four task forces, one for each intercity service corridor (Capitol, Pacific Surfliner [formerly San Diegan], San Joaquin and Coast). These task forces, listed below, are comprised of existing organizations interested in intercity rail in the respective corridors:

- Capitol Corridor Joint Powers Authority (CCJPA)
- Southern California Intercity Rail Group (SCIRG)
- San Joaquin Valley Rail Committee (SJVRC)
- Coast Rail Coordinating Council (CRCC)

The membership of each task force includes local elected officials, Caltrans, metropolitan planning organizations (MPOs), freight and commuter railroads and the FRA. These task forces reviewed existing service levels, defined future service needs and identified projects and funding necessary to accomplish their goals. This planning process aims to achieve a statewide consensus on intercity passenger rail planning, enhance a complementary relationship with growing passenger and freight rail services and promote sustained sources of funding for rail corridor development.

Amtrak and its partners in planning have been working together on these objectives. The community-based planning process has considered business and personal travel, as well as daily commuter and the valuable freight services, with which intercity and commuter trains share tracks. California's mixed-use rail corridors are heavily congested; improvements to these corridors are needed to support the continued growth of intercity, commuter and freight services as the state's economy expands and evolves.

Unfortunately, these improvements cannot be met by merely adding faster trains. Rather, the infrastructure to increase capacity, reduce trip times and improve operational reliability must be in place before new service can be added. For instance, to accommodate an increase in passenger service in each of the corridors, the following improvements may be required:

- Additional track capacity to minimize or eliminate passenger and freight rail dispatching conflicts because they operate on shared track, resulting in delays
- Rail equipment maintenance and storage facilities
- Rail/highway grade crossing improvements
- Track and signal/communication improvements to allow trains to operate at higher speeds, enhance safety and achieve reduced trips times.
- Expanded or upgraded stations to accommodate additional passengers and services

Increased levels of passenger service could also impact freight service. Steps must be taken to maintain capacity for freight operations as new passenger services are added. In some cases, this would be accomplished by introducing entirely separate tracks for freight and passenger train routings.

## Corridor Task Forces

The partners in planning represented a diverse set of interests, needs and opportunities. A task force guided the planning process in each of the four corridors. These task forces were comprised of decision-makers, agency staff and other interested parties. They were created to reach out to the rail transportation stakeholders and empowered to represent and make decisions for their respective corridors. Over 40 members participated in the Corridor Task Forces statewide, as listed in the Task Force Members table.

In addition, freight and commuter rail owners and operators collaborated to ensure that future recommendations were part of an integrated solution. To further facilitate stakeholder outreach, an interim report, entitled the *Amtrak California Passenger Rail System Five-Year Improvement Plan Summary Report, Draft Final,* May 15, 2000, revised June 15, 2000 (Five-Year Improvement Plan Summary Report), was issued to share preliminary findings and solicit input. A project newsletter was also distributed and a public website was created (http://www.amtrakwest.com/califuture) to reach a wide range of interested groups around the state, informing them of the study and providing a vehicle for input and comment.

Amtrak and plan-manager team members regularly attended and participated in task force meetings. Task force representatives were also able to utilize a state-of-the-art project management website for reference and participation in document reviews.

**TASK FORCE MEMBERS**

| Capitol | Pacific Surfliner | San Joaquin | Coast | Members serving on all four task forces |
|---|---|---|---|---|
| Steve Cohn, *Councilmember City of Sacramento, **Chair*** | Julianne Nygaard, *Councilmember, City of Carlsbad, **Chair*** | Stanley Thurston, *Councilmember, City of Merced, **Chair*** | Dave Potter, *Supervisor, Monterey County, **Chair*** | DJ Mitchell, *Assistant Vice President, The Burlington Northern & Santa Fe Railway* |
| Thomas Blalock, *President, Bay Area Rapid Transit District* | Robert Arthur, *Los Angeles County Metropolitan Transportation Authority* | Robert Cabral, *Supervisor, San Joaquin County* | Blanca Alvarado, *Supervisor, Santa Clara County* | Peter Montague, *Rail Economist, Federal Railroad Administration* |
| Doras Briggs, *Citizen Representative, Amtrak West Coast Advisory Committee* | Arthur Brown, *Councilmember, City of Buena Park* | Judith Case, *Supervisor, Fresno County* | Robert Arthur, *Los Angeles County Metropolitan Transportation Authority* | Michael Ongerth, *General Manager, Joint Facilities and Passenger Operations, Union Pacific Railroad* |
| Sam Dardick, *Supervisor, Nevada County* | Sarah Catz, *Orange County Transportation Authority* | Illa Collin, *Supervisor, Sacramento County* | James Beall, *Supervisor, Santa Clara County* | Warren Weber, *Rail Program Manager, Caltrans* |
| Jim Lawson, *Councilmember, City of Milpitas* | Dave Ekbom, *Councilmember, City of Grover Beach* | Jim Costa, *California State Senator, District 16* | Richard Boomer, *Councilmember, City of Hollister* | |
| John Mayer, *Councilmember, City of Sparks, Nevada* | Joe Kellejian, *Councilmember, City of Solana Beach* | Jane Dolan, *Supervisor, Butte County* | Bill Davis, *Mayor, City of Simi Valley* | |
| Scott Perry, *Mayor, City of Colfax* | William Kleindienst, *Mayor, City of Palm Springs* | George Gaekle, *Stanislaus County* | Joni Gray, *Supervisor, County of Santa Barbara* | |
| | Robert Nolan, *Mayor, City of Upland* | John Gioia, *Supervisor, Contra Costa County* | Arthur Lloyd, *Boardmember, Peninsula Corridor Joint Powers Board* | |
| | Richard Weinberg, *Councilmember, City of Carpinteria* | Alene Taylor, *Supervisor, Kings County* | Frank Mecham, *Mayor, Paso Robles* | |
| | | Molly Wilson, *Supervisor, Shasta County* | Oscar Rios, *Councilmember, City of Watsonville* | |
| | | | Michael J. Yaki, *Supervisor, City of San Francisco* | |

## California's Passenger Rail System

Over the past decade, several new passenger rail services and expansions have been implemented or are under consideration, including a statewide very high-speed rail system. A key component of the overall rail network is the existing intercity service. This service, shown in Figure OVERVIEW-1 and described below, includes four principal corridors covering over 1,300 route miles and spanning almost the entire state. Within these corridors, the intercity passenger service currently shares track with freight and/or commuter services.


***Figure OVERVIEW-1: Existing Intercity Service***

- <u>*Capitol Corridor:*</u> This corridor connects the San Jose, Oakland, Sacramento, Roseville and Auburn regions. Service provided on this corridor includes Amtrak intercity service (operated in partnership with CCJPA) and ACE service.
- <u>*Pacific Surfliner Corridor:*</u> This corridor connects the San Diego, Los Angeles, Santa Barbara and San Luis Obispo regions. Service provided on this corridor includes Amtrak intercity service (operated in partnership with Caltrans) as well as Metrolink and Coaster commuter services.
- <u>*San Joaquin Corridor:*</u> This corridor connects the Oakland, Sacramento, Stockton, Bakersfield and Los Angeles regions with Amtrak intercity service in partnership with Caltrans.
- <u>*Coast Corridor:*</u> This corridor connects the San Francisco Bay area, Salinas, San Luis Obispo, Santa Barbara and the Los Angeles regions. Service provided on the corridor includes Amtrak Intercity (*Coast Starlight*) service, and Caltrain commuter service.

Each of the state's major rail corridors has tremendous potential to increase ridership and travel choices, but each is confronted with unique challenges. The goal of the plan is to initiate a step-by-step approach to meeting each corridor's specific needs. This will significantly improve the public's options for rail travel and mobility throughout the state. Those involved in the planning process share Amtrak's objectives of expanding and enhancing the intercity rail network by improving capacity, trip times and operational reliability.

## Connections with Other Passenger Rail and Rail Transit

A number of other passenger rail services exist throughout the state. Such services include commuter rail systems operated by Metrolink, Coaster, Caltrain and ACE, as well as rail transit systems that provide mass transportation in urban areas, such as the Los Angeles County Metropolitan Transportation Authority's (MTA's) Blue Line and the Bay Area Rapid Transit (BART) system. This plan does not address improvements to the mass transit systems, which operate on separate dedicated tracks.

Amtrak offers the only intercity rail service in California. The California High-Speed Rail Authority (CA HSRA) is planning a system of very high-speed trains that traverse the state at speeds over 200 mph. The proposed very high-speed system would require a dedicated, fully grade-separated right-of-way. The CA HSRA is currently beginning the formal environmental process with the preparation of a program-level environmental document for the proposed statewide system. As this process moves forward, every effort will be made to ensure that the California very high-speed rail and the planned intercity service improvements complement each other.

# Freight Interface

All passenger rail services in this plan use tracks that freight trains use as well. Most of these tracks are owned by either BNSF or UPRR. These private companies must meet their obligations to shippers of goods while maintaining safe conditions for the public in communities along their rights-of-way. Ensuring freight mobility and transport of goods to market quickly and efficiently is critical to the state's economic health. Planning for California's passenger rail system must include strong cooperation with the freight railroads to provide for both growth in the system and the continued efficient movement of goods state-wide. Allowing for continued growth in service requires additional tracks, signal system upgrades and measures to increase safety for those who live or work near (or travel across) these busy railroad corridors. Also, the additional capacity for rail freight movement would reduce truck traffic on California's congested highway system, contributing to the extended life of the highway system.

Throughout the development of the 20-Year plan, there has been on-going coordination with freight railroads. For example, there has been close coordination with freight on the Pacific Surfliner between Los Angeles and Fullerton to jointly define the best approach for infrastructure capacity upgrades.

# Organization of This Plan

The improvements identified in this 20-Year Plan are organized into four chapters by corridor, Capitol Corridor, Pacific Surfliner Corridor, San Joaquin Corridor and Coast Corridor. The vision for each corridor will be implemented through a phased approach, introducing infrastructure improvements over a 20-year time period, depending on market demand and available funding. Three periods or planning horizons organize the improvements and associated benefits as described below.

### IMMEDIATE

The Immediate planning horizon is a one- to three-year time frame. Projects identified in the Immediate planning horizon are critically needed to support current rail operations and are realistically achievable in the next two to three years. The projects would meet existing needs and build towards attaining near- and long-term intercity service goals, as well as the requirements of freight and commuter rail services.

Some of California's most immediate needs include relieving existing rail congestion, improving rail infrastructure to allow current services to operate at higher speeds, and safety enhancements focused on highway/rail interfaces.

### NEAR-TERM

The second level of improvements are planned for implementation during the Near-term planning horizon, or four- to eight-year time frame. Projects identified in the Near-term planning horizon build upon the Immediate-term projects to provide an infrastructure necessary to support the 2005 intercity, commuter rail and freight service goals. Continuing beyond 2005, the Near-term projects are the foundation for the third level of improvements in the nine- to twenty-year time frame, creating the long-term Vision framework for California.

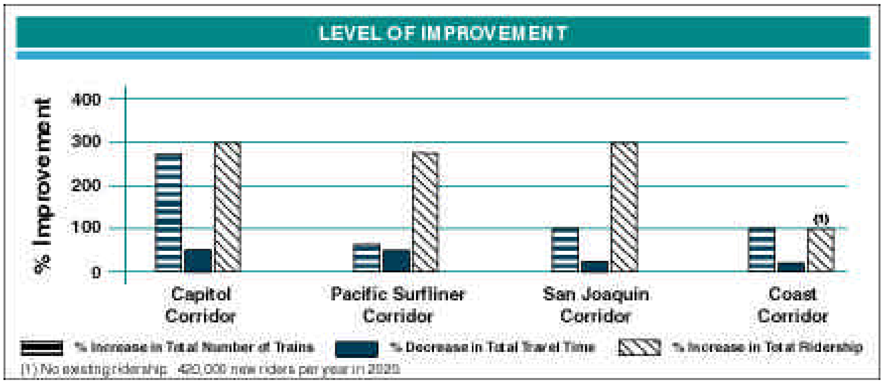
### VISION

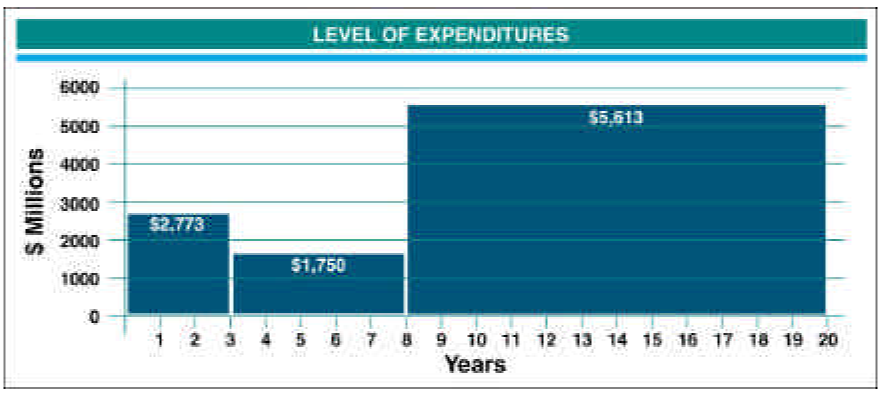
It is in the third level of improvements where the long-term Vision is realized for California. While these projects are proposed to evolve over the next nine to twenty years, particular elements (e.g., planning or environmental tasks for these projects) would need to be aggressively initiated in the Immediate and Near-term for the Vision projects to be completed.

The development of this vision represents an unprecedented partnership among Amtrak, Caltrans, the local transportation agencies, commuter rail authorities, freight railroad companies and communities throughout the state. By working together, project planning, funding and delivery are well coordinated and accelerated. The development of the vision by this partnership ensures our ability to secure necessary funding to achieve the vision in an efficient and timely manner.

## Shared Investments: Shared Benefits

Amtrak's mission is to provide high-quality passenger rail service on its intercity corridors. These services share tracks and stations with the freight railroads and commuter rail agencies. Facing shared challenges, the 20-year plan targets improvements in the areas that would benefit all rail users, including shippers and commuters. Because of these multiple benefits, this plan would garner the support of multiple interests: commuter, intercity, and freight railroads, as well as the communities in which they serve. The communities affected would see not only better service, but also needed safety improvements, such as roadway/rail crossing upgrades. The following identifies the Level of Improvements and the Level of Expenditures over a 20-year period that would yield the benefits of increased number of trains and ridership, and a decrease in travel time.




*A total of* ***$2.7 billion*** *invested over the next one to three years.*

*A total of* ***$1.7 billion*** *invested over the next four to eight years.*

*A total of* ***$5.6 billion*** *invested over the next nine to 20 years.*

All projects will be developed concurrently to ensure that they will be built in a timely manner. The first priority will be to construct projects that are maintenance-related and relatively unconstrained by institutional barriers. Upon plan completion in 2020, over $10.1 billion in improvements would be completed, in the increments shown in Table OVERVIEW-1.

**Table OVERVIEW-1**
**Corridor Cost by Planning Horizon**

| Corridor | Immediate | Near-term | First 10 Years Subtotal | Second 10 Years Vision | Total |
|---|---|---|---|---|---|
| Capitol | $ 259 | $ 198 | $ 457 | $ 1,030 | $ 1,487 |
| Pacific Surfliner | 979 | 750 | 1,729 | 2,561 | 4,290 |
| San Joaquin | 655 | 283 | 938 | 952 | 1,890 |
| Coast | 326 | 278 | 604 | 320 | 923 |
| **Total Intercity & Shared Corridors** | **$ 2,219** | **$ 1,509** | **$ 3,728** | **$ 4,863** | **$ 8,591** |

**Table OVERVIEW-1 (continued)**
**Corridor Cost by Planning Horizon**

| Corridor | Immediate | Near-term | First 10 Years Subtotal | Second 10 Years Vision | Total |
|---|---|---|---|---|---|
| | | | | | |
| Year 2000 Exclusive Commuter Corridors | $ 554 | $ 241 | $ 795 | $ 750 | $ 1,545 |
| | | | | | |
| **Grand Total** | **$ 2,773** | **$ 1,750** | **$ 4,523** | **$ 5,613** | **$ 10,136** |

# OVERVIEW OF THE TECHNICAL PROCESS

## Engineering and Environmental/Institutional Analysis

Corridor studies identified the improvements needed to meet the current needs and the planned service goals for the following existing intercity rail corridors:

- Capitol Corridor: San Jose to Oakland to Sacramento to Auburn/Colfax
- Pacific Surfliner Corridor: San Diego to Los Angeles to Santa Barbara to San Luis Obispo
- San Joaquin Corridor: Bakersfield to Stockton to Oakland/Sacramento
- Coast Corridor: Los Angeles to San Francisco/Oakland

For emerging corridors (Los Angeles to Palm Springs/Coachella Valley, San Francisco to Monterey, Auburn/Colfax to Reno, Sacramento to Redding, and Bakersfield to Los Angeles), corridor extensions or options were identified during the study process. In each of these corridors, Amtrak and its partners will undertake more detailed planning in the near future.

The corridor studies focused on trip-time improvements and other necessary capacity upgrades for passenger service expansion, with incremental speed improvements from present maximum speeds of 90 mph to 110 mph and potentially up to 125 mph planned over the life of the study. While addressing intercity, commuter, and freight traffic growth on the corridors, these studies also considered the manner in which the CA HSRA can integrate the corridors into the very high-speed spine system and corridor network currently in the early stages of planning.

In developing the corridor analyses, the project team performed feasibility studies, identified needed improvements and potential environmental impacts, prepared conceptual engineering plans, developed cost estimates and analyses and defined time frames for the identified improvement projects in each corridor. The methodologies used to perform the corridor studies and the associated products are discussed below.

### EXISTING PHYSICAL CONDITIONS REPORT

Existing Physical Conditions Reports were prepared for each corridor to document their existing condition. The goals of the reports were to summarize the findings and conclusions regarding each corridor in the following two areas:

- The ability to safely and reliably handle the existing levels of Amtrak, freight, and commuter rail service, based on available data and site visits
- The identification of infrastructure improvements necessary to provide consistently reliable existing rail service levels

To prepare the reports, available relevant data from Amtrak, freight and commuter railroads and various governmental agencies were assembled and reviewed for each corridor. This data included information on track clearances, track configurations and conditions, roadbed and under-grade bridge conditions, signal and traffic control systems, rail/highway grade crossing, warning devices, passenger stations, rolling stock (i.e. locomotives and rail cars), and layover and maintenance facilities. This information was supplemented with site visits to the corridors to conduct observations and determine existing conditions.

Each corridor description below contains summaries of the Existing Physical Conditions Reports prepared by the corridor teams. Appendices B, C, D, and E provide a comprehensive discussion of the existing physical conditions of the Capitol, Pacific Surfliner, San Joaquin, and Coast Corridors, respectively.

### PROPOSED IMPROVEMENT PROJECTS REPORT

A Proposed Improvement Projects Report was developed for each corridor. The reports were based on reviews of current, available, published plans, studies and reports. Current data from Amtrak, applicable freight and commuter railroads and public agencies for planned and programmed rail improvement projects in each corridor were also used to formulate the reports. They addressed infrastructure, facilities, signal systems, and rolling stock from the perspectives of safety, increased capacity, improved reliability and reduced trip time. The improvement project plans, studies, and reports were reviewed for their reasonableness and assessed for the potential of the plans to contribute to improved trip times and increased capacity on the corridors.

The Proposed Improvement Projects Reports document each proposed improvement project by corridor. Each project report includes the following information:

- Brief project description
- Project location by railroad milepost
- Estimated project cost and basis for cost estimate, if available
- Funding source for project, if identified, including federal, state, local and private sources
- Design and construction schedules
- Potential benefits provided by the project, including patronage and improved travel time and reliability
- Anticipated impacts on Amtrak, freight or commuter railroad operations on the corridor

The Proposed Improvement Projects Reports summarize the results of the existing plans, studies and report reviews; document each proposed improvement project, as described above; assess the reasonableness of the project; and describe the potential of the projects to improve trip times and capacity on the corridor. These projects were grouped in categories by type of improvement such as:

- Track construction (e.g., additional main tracks, siding extensions, curve enhancements and clearance improvements)
- Track structure and roadbed (e.g., track and roadbed FRA class upgrades)
- Railroad bridges
- Highway and pedestrian grade crossing warning devices
- Signal and traffic control systems (e.g., supplemental signals and centralized traffic control [CTC])
- Highway/railroad and railroad/railroad grade separations
- Stations (e.g., new stations, ticket vending equipment and station improvements)
- Proposed connections with other public transit services
- Parking
- Maintenance and layover facilities
- Rolling stock

The Proposed Improvement Projects Reports are found in Appendices F, G, H and I for the Capitol, Pacific Surfliner, San Joaquin and Coast Corridors, respectively.

### OWNERSHIP AND OPERATING AGREEMENTS REPORT

Ownership and Operating Agreements Reports were prepared for each corridor to provide a summary of track and station ownership issues, such as air rights and operating agreements. These summaries focused on ownership, operating rights, limitations, procedures for train schedule changes, expiration dates, cost allocation for expenses, train dispatching rules and philosophies, performance criteria, incentives or penalties clauses and third-party involvement. All operating agreements between the owners and operators of rail service, both freight and passenger, were reviewed to prepare the Ownership and Operating Agreements Reports.

The corridor teams prepared the Ownership and Operating Agreements Reports for the Capitol, Pacific Surfliner, San Joaquin and Coast Corridors, shown in Appendices J, K, L and M, respectively.

#### PROGRAM OF RECOMMENDED IMPROVEMENT PROJECTS

Corridor teams developed a Program of Recommended Improvement Projects that would accommodate the projected levels of intercity passenger, commuter, and freight service and trip time goals for intercity passenger service through the planning year 2020. These programs were formulated to optimize trip time and capacity for the Immediate, Near-term and Vision planning horizons. The impacts of future intercity and commuter operations on freight service were assessed when alternative projects were considered.

The Program of Recommended Improvement Projects for each corridor was initially documented in a Recommended Projects List for each corridor by planning horizon. These initial lists were then utilized to perform the operations and modeling simulations described in the following sections. Projects that in aggregate, met the established optimal trip time and capacity objectives were identified for each corridor for each planning horizon.

Applicable environmental and institutional impacts on the corridors were identified and described for each recommended improvement project. Corridor teams performed preliminary environmental evaluations, which documented environmental resources, potential project issues/impacts, and conceptual mitigation measures; identified future environmental clearance and additional technical studies; and documented potential permit and agency coordination requirements for the projects.

Corridor teams also documented the permitting requirements of the various federal, state and local agencies (e.g., U.S. Army Corps of Engineers, Environmental Protection Agency, and California Coastal Commission) for implementing improvement projects along the corridors, and the time frame to complete the processes.

Corridor teams conducted institutional issues and opportunities analysis for each corridor. These analyses were tailored to reflect the unique conditions within each corridor with regard to existing and potential institutional arrangements and opportunities for securing funding from federal, state, regional, local and private-sector sources, including freight railroad participation. The analysis synthesized the objectives, barriers to success and trade-offs associated with implementation of the proposed improvements within the corridors, and determined key sensitivities and concerns of the entities that manage and operate particular corridor services. In addition, the evaluation included recommendations for strengthening existing institutional arrangements or creating new ones, to facilitate implementation of the proposed corridor improvement programs. The key activities of the analyses included:

- Identifying existing institutional arrangements for planning, programming, funding and implementing capital and service improvements in each corridor
- Identifying key institutional stakeholders, their objectives and planned and programmed capital improvements with respect to intercity, commuter and high-speed rail passenger and freight services
- Documenting the relationship of the proposed corridor improvements to other existing or proposed rail transportation services in the corridor
- Identifying sensitivities and concerns of Task Forces, their members, and other stakeholders through meetings and other contacts
- Identifying potential institutional arrangements that could enhance opportunities for funding and implementing proposed capital and service improvements and that would foster coordination among the stakeholders

Corridor teams prepared conceptual engineering plans for selected recommended improvement projects. The plans show the scope and level necessary for determining cost components of the project and for making quantity determinations for the construction cost estimates. Section and elevation drawings were provided, when necessary, to convey the scope of the project.

Corridor teams reviewed existing cost estimates. Where appropriate, updated conceptual capital costs estimates were made for these proposed projects. Conceptual capital costs estimates were also prepared for each new improvement project or current project proposed scope expansion.

Based on the existing conditions (existing physical conditions, planned and programmed improvement projects and ownership and operating agreements), the corridor teams identified a Program of Recommended Improvement Projects within each corridor for each planning period to sufficiently increase capacity and reduce the trip time for the corridor from the baseline trip time to the optimal trip time.

For each planning period, the recommended improvement projects were prioritized to identify those projects that are most likely to produce significant trip time and capacity improvements and are most cost-effective. The improvement projects were ranked and compared, based on the data developed in the study, to identify the relative benefits and costs.

## Service Planning

A comprehensive planning process began in the early stages of the study with a ridership demand forecast of annual intercity rail passengers for the 2005, 2010 and 2020 time frames. This forecast served as the foundation for crafting an appropriate service strategy for each corridor. Various levels and frequencies of service were applied to test the sensitivity of the demand model. The number of trains in future service plans emerged as a result of estimating what capacity would be required to accommodate the numbers of forecasted intercity rail customers in those future years. In addition, optimal trip time objectives were produced during the initial Train Performance Calculator (TPC) analysis to generate potential schedules. Applying the schedules interactively to the ridership demand process identified the most desirable combination of travel time and train frequency.

### RIDERSHIP MODELING

Ridership forecasts were developed for all of the future operating scenarios using the Amtrak/Caltrans Intercity Rail Passenger Forecasting Model, developed by KPMG Peat Marwick. This model has been used by Amtrak and Caltrans – who jointly funded its development, maintenance, and application – to support ongoing intercity passenger rail corridor service planning throughout California. The model originally focused on the Capitol and San Joaquin routes exclusively, but has since been expanded to address the Pacific Surfliner route and proposed new routes and extensions throughout the state. The model includes the following major components:

- Existing travel volumes by car, truck or van over the highway system – expressed by origin/destination market
- Existing travel volumes by rail – expressed by origin/destination market
- Socio-economic data and forecasts for each origin/destination area
- Highway network characteristics – travel distances, speeds and times over the highway network between origins and destinations as well as origins/destinations and stations
- Rail Service Characteristics – expressed in a passenger timetable format
- Rail Passenger Fares – expressed as average yields by market
- A total travel demand growth model component – which estimates total growth in existing highway/rail travel volume by origin/destination market
- A mode share model component – which estimates the share of travel that is expected to use highway (car, truck or van) and rail modes by origin/destination market

Forecasted rail ridership is derived from the total travel demand growth and mode share with existing travel volumes as a base.

**Existing Travel Volumes by Highway and Rail**

The Amtrak/Caltrans Intercity Rail Passenger Forecasting Model includes extensive data quantifying travel volumes by mode (highway and rail) and origin/destination markets based on numerous surveys sponsored by Amtrak and Caltrans statewide. Over the past eight years, highway surveys have been conducted at the following key locations:

- Interstate 80 near Fairfield
- Interstate 580 at Altamont Pass
- Interstate 5 between Sacramento and Stockton
- State Route 99 near Galt
- State Route 99 near Madera
- Interstate 5 near Grapevine
- U.S. Highway 101 near Gilroy
- U.S. Highway 101 near Camarillo
- Interstate 5 near San Juan Capistrano

These surveys were conducted by: (1) videotaping license plates of a sample of vehicles passing each location; (2) processing the license plates (by the state) to obtain owner addresses; and (3) mailing a self-administered mail-back survey to each vehicle owner. Extraordinary efforts were undertaken to maintain the privacy of survey participants. No records of individual names and addresses were retained. The survey questionnaires included trip origin, trip destination, trip purpose and other related trip and traveler information. In parallel with the highway surveys, Amtrak has conducted several rail passenger surveys on-board the Capitol, San Joaquin and Pacific Surfliner trains. Among other issues, these survey questionnaires also included trip origin, trip destination, trip purpose and other related trip and traveler information.

**Socio-Economic Data and Forecasts**

Key socio-economic measures included in the Amtrak/Caltrans Model include:

- Population
- Employment
- Household income

Population data was obtained from the State of California's Official Population Projections. Unlike population, the state does not publish projections for employment or income. These were obtained from DRI/McGraw Hill, a national econometric forecasting series.

**Highway Network Characteristics**

Highway distances and travel times were developed from an intercity highway network, representing interstate and primary highways. The network connects all origin and destination study area zones as well as passenger rail stations within the state. The highway network was derived from the U.S. Department of Transportation's National Highway Planning Network (NHPN) for California, supplemented by speed data obtained from Caltrans' Statewide Model highway network.

Standard network analysis and summation procedures were used to process the highway network and extract highway distances and travel times along the minimum time path between each origin/destination pair, and between each origin/destination-station pair. Travel times for long trips in excess of 90 minutes were modified by adding time for stops at the rate of 0.15 minutes for each minute in excess of 90 minutes. Travel cost was computed by applying the following average costs per mile to the distance:

- $0.27 per mile for business travel
- $0.10 per mile for non-business travel

The former represents a fully allocated cost, including fixed costs, reflected in a business travel reimbursement, while the latter reflects only incremental out-of-pocket costs.

**Rail Service Characteristics**

Rail service characteristics are specified in the form of a passenger timetable, which shows for each train the scheduled arrival and departure times at each station. Taken together, this schedule information defines the travel time and frequency of rail passenger service provided between each pair of stations. Access distance, time, and cost were obtained from the highway network process described above, for each zone-station pair.

**Rail Passenger Fares**

Rail fares are based on actual average yields, expressed as revenue per passenger, between each pair of stations. The use of average yields, as opposed to published fares, captures the combined effects of all discounts and facilitates the computation of ticket revenues.

**Total Travel Demand Growth Model Component**

This model component estimates growth in total travel demand that is applied to the existing travel volume data, described above. The resulting total travel demand forecasts define the total market size to which the modal shares are applied to produce ridership forecasts by mode. In general, there are two major influences on the total travel demand between any two geographic areas:

- Population growth and changes in economic activity in the geographic areas
- Changes in the modal levels of service provided between the geographic areas

Measures used to represent the impacts of these respective changes include:

- Socio-economic data and forecasts, including population, household income and employment
- Composite modal level of service, defined by the modal share model component described below

**Mode Share Model Component**

This model component estimates the share of travel that is expected to use highway (car, truck or van) and rail modes by origin/destination market. It captures the competition between air, highway, and rail modes as a function of the characteristics of the modes. These key independent variable characteristics include:

- Travel Time – expressed separately for line haul and station access portions of rail trips
- Travel Cost (or fare)
- Frequency of Service – which also captures the relative performance of train departures/arrivals at different times of day

**Ridership Forecast Results**

Based on the results from the Intercity Rail Passenger Forecasting Model and the level of service identified for each corridor, the ridership forecast is shown in Table OVERVIEW-2.

**Table OVERVIEW-2**
**Intercity Ridership Forecast**

| Corridor | Annual Ridership (in millions) | | | |
|---|---|---|---|---|
| | **Current** | **2005 Forecast** | **2010 Forecast** | **2020 Forecast** |
| Capitol | 0.77 | 1.50 | 2.40 | 3.10 |
| Pacific Surfliner | 1.57 | 3.34 | 4.71 | 5.76 |
| San Joaquin | 0.67 | 1.30 | 2.06 | 2.76 |
| Coast | N/A | 0.20 | 0.34 | 0.42 |
| **Total** | **3.01** | **6.34** | **9.51** | **12.04** |

## OPERATIONS MODELING AND SIMULATION

Operations modeling efforts for this plan played a critical role in the development of comprehensive service strategies for California's rail transportation network. The operating analysis conducted as part of the modeling work contributed to solutions for the technical challenges associated with line capacity, train movements on complex joint-use rail corridors and optimization of scheduled running times.

### Modeling Objectives

The main objectives in this modeling approach included the following:

- Utilize a modeling technique that directly relates the utility of alternative infrastructure improvements to the number and type of passenger and freight trains to be operated.
- Provide a flexible simulation program, through which combinations of train speeds, service levels and frequencies and physical infrastructure capacity can be modeled.
- Make the iterative process of testing for the optimum match of physical plant and operating demand sufficiently manageable so that alternatives can be tested effectively and in a timely fashion.
- Provide sufficient sophistication and detail to be able to model the "real world" of the railroads, where things sometimes go wrong (i.e., longer trip times).

### Modeling Description

These efforts resulted in the development of a railroad network simulation model encompassing over 1,300 route miles of existing California rail corridors.

> *This model is unprecedented in its size and complexity and incorporates the detailed physical and operational characteristics of all freight and passenger rail (commuter and intercity) joint-use corridors.*
>
> *The model was built to connect the individual corridor identities, for the first time, into a functional, fully integrated rail network of these California study corridors. Train movements for all service providers on all four corridors were simultaneously evaluated including BNSF and UPRR freight trains and Coaster, Metrolink, ACE, Caltrain, and Amtrak passenger trains. The simulation model replicates the movements of over 1,700 trains in a given case analysis with a total of approximately 14,000 links modeled from Northern to Southern California. The network configuration is based on a structured, systematic approach that ensures coordination and comparability for each corridor.*

Utilizing Berkeley Systems' Rail Traffic Controller (RTC) simulation software program, analysis of the network provided a model to:

- Schedule the appropriate number of trains required

- Operate trains at the most desired times of day identified
- Minimize travel time

The results from the RTC simulation form the foundation for future passenger timetables and the specification of the service product on the corridors.

This is an application of “artificial intelligence” for dispatching trains and accurately answers the question of whether a specific infrastructure modification can support the operations of a particular combination of trains. For example, the train meet-pass-overtake logic inherent in the RTC model looks ahead of opposing and/or overtaking train movements in the model to identify the optimum control point to establish a meet or pass situation.

**Modeling Overview**

The infrastructure characteristics in the model were based on current track charts and on field review/verification, as provided by the owner and/or operator of the particular right-of-way. With projects defined, a full train dispatch scenario was modeled, and the resulting schedules were compared to the trip-time objectives.

**Input and Assumptions**

Physical Characteristics

The physical characteristics coded for each corridor include distance, speed, track alignment, grade, curvature, switches, and signals. Additional data, such as operating rules in effect, type of train control system, and ownership and railroad subdivision identities, were also recorded. Various project configurations were then modeled by enabling certain links and disabling others. This process allows the modeler to determine the resulting effects of implementing or not implementing certain projects. To achieve Amtrak’s goals, projects for each corridor were modeled in groups according to the benefits provided by the 2005 and Near-term planning horizons. The benefits resulting from these groups of projects were then described according to improvements in capacity, operational reliability and/or schedule trip times as compared with present operations.

Frequency and Level of Service

With overall service goals established for each corridor, levels of service, frequency of service, and optimum trip times were established. The level of service denotes the number of trains defined as origin/destination trips. The frequency of service defines the intervals between trains and estimates the departure and arrival times that are most attractive to customers. Optimum trip times were then determined as a result of analyzing the theoretical and practical travel times for each service based upon operating rules and regulations, physical plant and infrastructure configuration, trainset performance specifications, market-driven requirements and Amtrak’s and the freight railroad’s policies, as applicable.

Trip Times

A TPC model was first constructed to reflect the detailed infrastructure conditions for each corridor. The parameters considered included specifications for grades, curves, stations, interlockings, train control/signal system parameters, speeds, dwell time assumptions and trainset performance characteristics. These initial results were used to validate and calibrate the model for each of the corridors. The next step in the process was to define the trainset vehicle technology to be used for delivery of service. Using the trainset performance specifications, the TPC was used to produce unconstrained run results with proposed infrastructure characteristics. These initial runs were documented as optimal theoretical trip times by corridor and formed the foundation for comparing the RTC full train dispatch modeling results.

Train Movements

For the Baseline 2000 Model, Amtrak’s 1999/2000 timetables were used to obtain intercity revenue train movements. Commuter railroads serving the study corridors provided similar information. In addition, BNSF and UPRR provided details associated with freight train movements on the study corridors, which represented scheduled train details and/or typical actual performance. For example, BNSF shared its

2005 and 2010 service plan forecasts, which allowed for comprehensive analysis of future train volume dynamics on the affected corridors.

For simulation scenarios in the plan years of 2005 and 2010 that included upgrades and improvements, proposed service data was provided by the commuter railroads to assist the effort in accounting for train movements associated with their future operating plans. Amtrak schedules were based upon the frequency goals developed with Amtrak, corridor task forces and the corridor teams. The freight railroads provided various levels of data associated with freight train movements on the study corridors, which represented their assumption of future volume.

Infrastructure Improvements

The projects selected for modeling in the corridors were based on each corridor in its entirety. They represent a series of projects that would best support the Plan objectives of increasing capacity, improving operational reliability and reducing trip times. Other projects may be listed within the corridors that emerged from the analyses performed by each of the corridor teams. Infrastructure characteristics that were coded in the RTC network model reflected future conditions. These included planned capital improvements programmed by the owner/operators of the right-of-way and the year in which the improvements are expected to be in service (as determined by the corridor teams), along with corridor upgrade improvements recommended by the corridor teams to increase running speed and/or mitigate capacity constraints.

**Modeling Output**

To present the performance output in a dynamic comparative measure of train density/track capacity, the total number of "running time" minutes were compiled for each given case. Next, by recreating a "typical" four-day period within the model (96 hours, Monday through Thursday), the number of minutes of delay that can be expected due to train dispatching conflicts during this time were calculated based on the scenario's train density and track capacity. This full train dispatch model run assumes the scheduled number of passenger trains each day and varied the number and performance of freight trains as shown in the train data provided by the freight railroads. For example, the number of minutes of delay divided by the total minutes of running time is one ratio that reflects the reliability of the network.

The minimum and maximum running times were reported for each service corridor and compared with the 2000 trip times as well as the 2005 and Vision goals. As such, the *shortest* trip times listed for corridor segments represent minimal interference between train movements and the *longest* trip times listed reflect the effect of increased freight train movements on a particular day, creating instances where trains slowed down at certain locations along the segment.

The RTC model emulated the dynamics of density/capacity in the dispatch simulation so that for a specific volume of trains operating over a given line configuration, the elements of train location, train speed and time were measured with respect to each other. These three elements are the most critical ones to measure. They show whether the amount of trackage and its configuration are capable of supporting the volume of train movements that need to traverse the corridor.

Best available train movements for the rail carriers in each corridor were included and added to the model's database to reflect the dynamics of integrated train operations. Train dispatching conflicts were identified, analyzed and resolved, including meet, overtake and passing situations, recognizing that increased speeds require careful analysis when providing express or semi-express service or operating on joint-use segments. Finally, the full train dispatch simulation tested the operability, reliability, and performance of these train movements on each corridor. The outcome of this effort was to identify the threshold of practical line capacity and to produce an optimal attainable schedule trip time. The results of this train dispatch simulation contributed to providing credible conclusions associated with capacity, operational reliability, and schedule trip time, and identifying the most effective combination of corridor investment decisions.

**Sample Results and Findings**

The following graphics are provided to illustrate the results of the modeling efforts.

Stringline Chart

Figure OVERVIEW-2 is a sample of a stringline diagram, an effective tool with which to graphically present train movements. Stringline diagrams vividly show train movements plotted over distance and time. The sample stringline is from the San Joaquin Corridor and depicts trains running from Jack London Station in Oakland to Bakersfield Station over a 24-hour period. Mileposts are identified to the right of the station locations. The diagonal lines running across the chart represent individual trains and the alphanumeric codes superimposed over the plot lines represent the train identity number. The slope of the line, as well as where the lines intersect, represents train travel along the corridor including meet situations. The more vertical a line is between two time points the greater the distance covered in the time frame, and thus the higher the speed. Where a more horizontal line is found, it is indicative of situations where a train must reduce speed due to track grade, curvature, or another train occupying the track ahead. Where the lines intersect represents a train meet and a fully horizontal line segment in this circumstance is indicative of where a train is held to allow the opposing train to pass. Horizontal lines also identify freight trains doing work enroute and experiencing other delays, such as crew-change points.

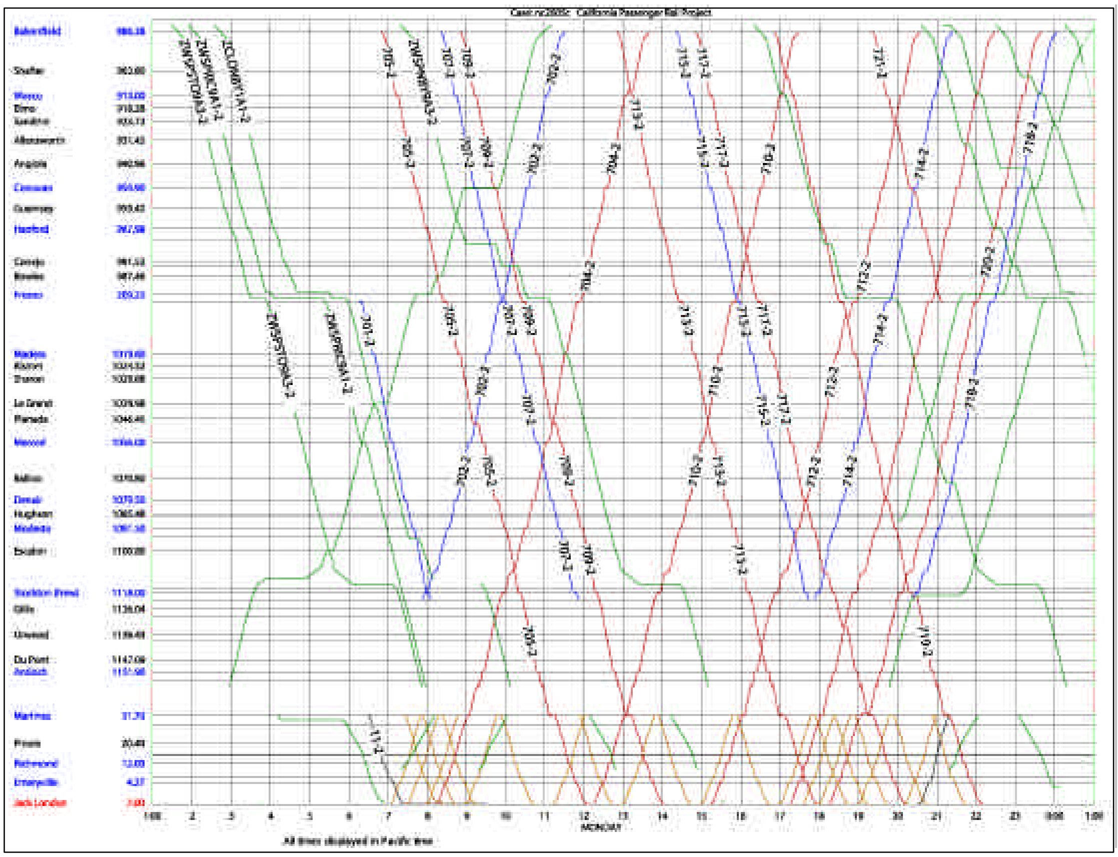


***Figure OVERVIEW-2: Sample Stringline Diagram***

Train Performance Calculator Chart (TPC)

Figure OVERVIEW-3 is a chart that presents the performance characteristics of train speed versus track speed limits along with track elevation. These characteristics are plotted by both elapsed time and corresponding milepost or station, with the time/distance plotted along the horizontal axis. The title of the graphic denotes the model run, the number of cars in the train consist, the weight and length of the train, the horsepower/tonnage available and the number and type of locomotives. The top plot showing the speed profile for this section of the San Joaquin Corridor shows the optimum speeds which are specified by the maximum authorized speed (MAS) in miles per hour, along with decreases in the upper speed limit due to such things as speed restrictions, stations stops, grade crossings and class of track. Superimposed on this plot are the actual modeled unconstrained train speeds, which in this case correspond well with the MAS.

The second plot on this graphic shows the change in elevation of the San Joaquin Corridor, in 500-foot increments.

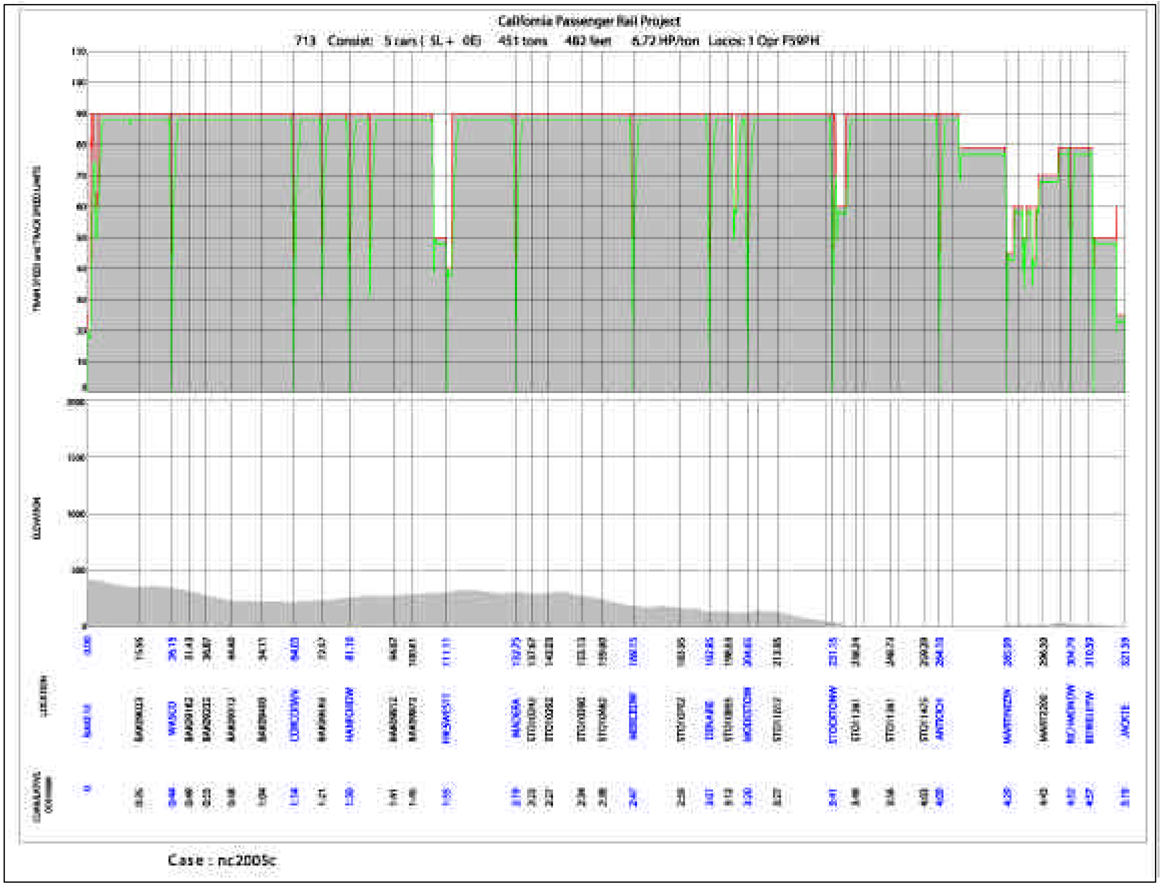



***Figure OVERVIEW-3: Sample Train Performance Calculator Chart***

<u>Network Representation</u>

The sample network schematic (Figure OVERVIEW-4) provides a graphic "map" of the infrastructure in a particular corridor, in this case the San Joaquin Corridor between Stockton and Bakersfield. The dots on the graphic are nodes, which are the locations of characteristics that could affect the operation of a train (e.g. switch, signal, changes in the speed of train) coded into the model. The horizontal lines between the nodes are called links, which are measured segments of track. The alphanumeric notations next to the nodes are related to the particular subdivision as identified on a railroad track chart. Crossovers and interlockings are represented in the graphic by the many diagonal lines, each representing one track.

Each node and link represents a series of physical and operational infrastructure characteristics that replicate the track charts for a base case model run. Projects identified by the corridor teams were also coded into the model for additional runs based on proposed improvements to provide simulations that would identify improvements in travel time, capacity and/or reliability.

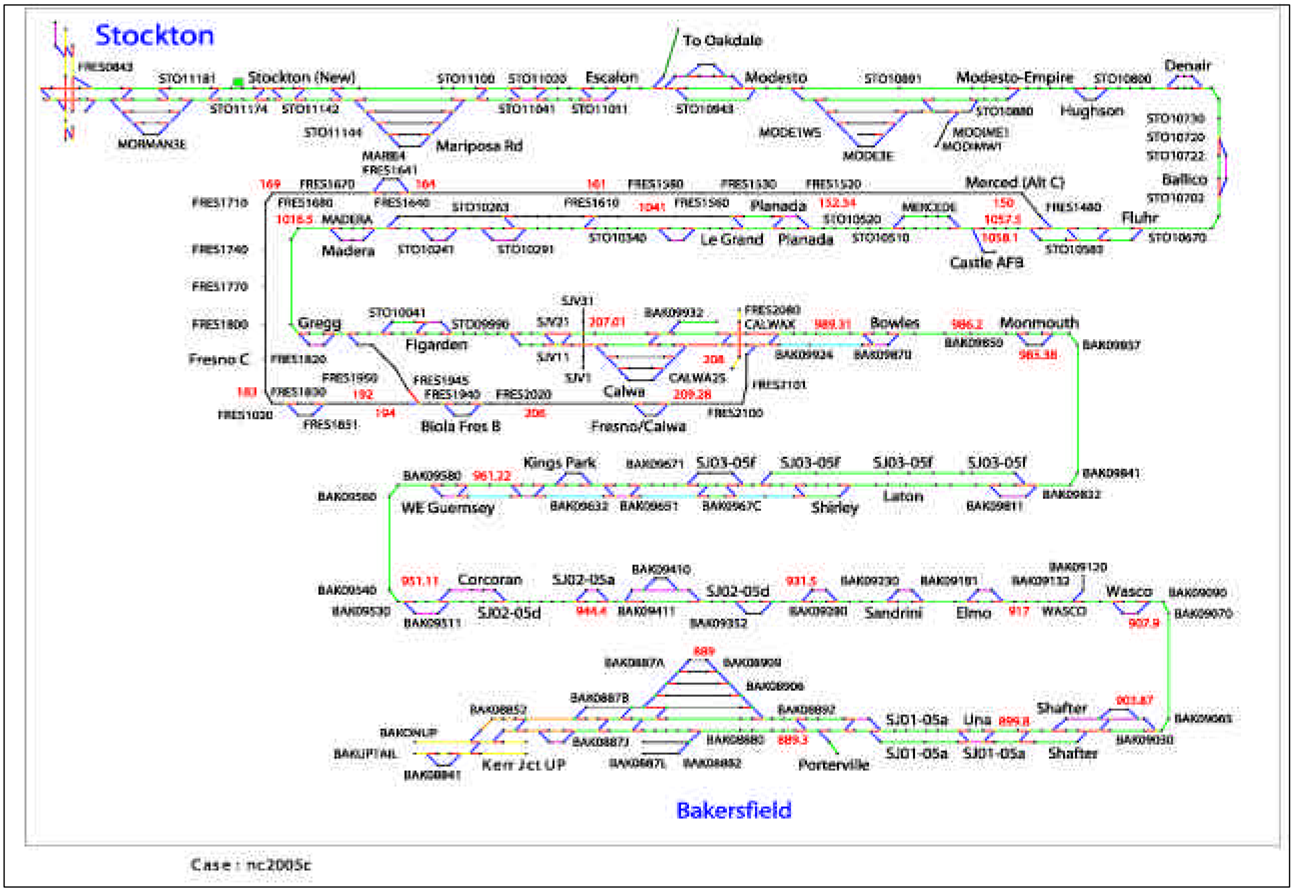



***Figure OVERVIEW-4: Sample Network Schematic***

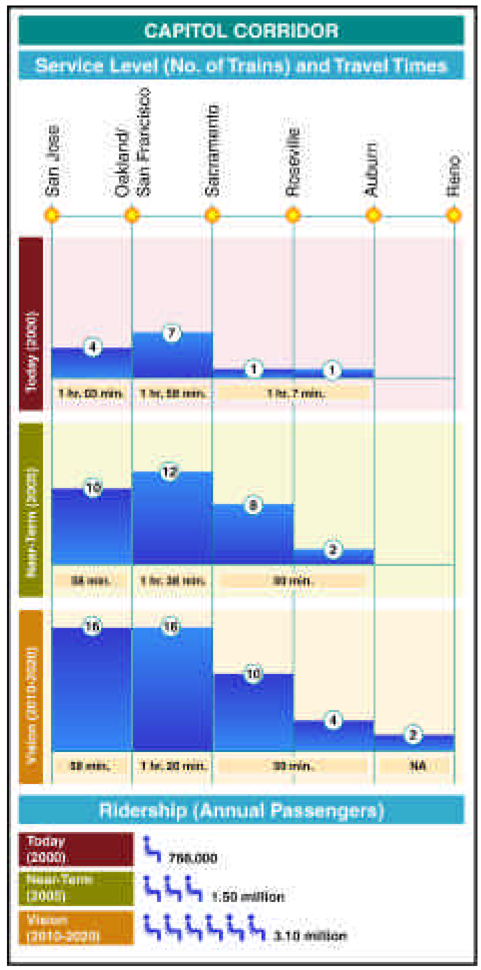
### BENEFITS

Because the analysis required the assessment of multiple corridors in a vast geographic area, this simulation model of the entire California network is extremely valuable in contributing to comparative analysis and performance evaluation for project prioritization and program implementation. The immediate, Near-term and long-term plans can be assessed credibly and confidently when reviewed in the context of the major funding sources and with the stakeholders.

# CAPITOL CORRIDOR

By connecting the Silicon Valley, the Bay Area and the state's capital, the Capitol Corridor provides an increasingly vital component of the state's transportation system. The Capitol Corridor currently serves San Jose, Oakland/San Francisco, Sacramento, Auburn and the foothill communities northeast of Sacramento. It has seven daily roundtrips between Oakland/San Francisco and Sacramento, four between San Jose and Oakland/San Francisco and one between Sacramento and Auburn (Figure CA-1). In addition, UPRR, which owns the right-of-way and track, operates freight service over the entire corridor.


*Figure CA-1: Capitol Corridor*




Northern Californians are embracing improved and increased Amtrak Capitol Corridor service at unprecedented levels because they realize that swift, frequent public transportation contributes to their personal and professional quality-of-life. Capitol Corridor train service provides a comfortable, relaxed environment for productively working on the trains and relieves the stress associated with the growing traffic congestion along Interstates 80, 680 and 880.

The importance of this corridor is best illustrated by its recent service expansions. In late 1998/early 1999, the fifth and sixth trains between Oakland/San Francisco and Sacramento were added. In February 2000, a fourth train between Oakland/San Francisco and San Jose and a seventh between Oakland/San Francisco and Sacramento were added. This corridor currently serves 768,000 passengers annually. With a 41-percent increase in ridership (FFY 1999-2000), the Capitol Corridor is Amtrak's fastest-growing rail service in the nation.

## Vision: On The Right Track

Primary goals of the plan are to provide hourly service between San Jose and Sacramento with travel time of less than two and one-half hours and to significantly increase service to the Foothill communities northeast of Sacramento. Amtrak and CCJPA plan to expand service between San Jose and Oakland/San Francisco to ten daily roundtrips by 2005 and sixteen by 2020. Between Oakland/San Francisco and Sacramento, plans call for twelve roundtrips by 2005 and sixteen by 2020. Service would extend east of Sacramento to Roseville with eight roundtrips in 2005 and ten by 2020. Additionally, service would be extended beyond Roseville to Auburn with two roundtrips in 2005 and four by 2020.

The 20-year vision would reduce the average running time between San Jose and Sacramento by 20 percent compared to existing travel times.

With the increased service and reduced trip times, ridership would increase from the current 768,000 to roughly 3.1 million.

Ultimately, it is envisioned that the rail lines to Reno, Salinas, Monterey and Hollister may be key components of the vision to provide the highest level of service possible for the communities within the congested Bay Area.

The first priority of the CCJPA, Amtrak and the task force is to provide more trains to San Jose and Silicon Valley in order to balance the train service in the corridor. San Jose is the busiest station in the Capitol Corridor in terms of total passengers served by intercity and commuter rail services such as ACE and Caltrain and total train movements in the vicinity.

### Capitol Corridor Benefits

**Direct Benefits**

- Increase intercity ridership by 300%
- Add hourly service between San Jose and Sacramento
- Add 12 new roundtrips from San Jose to Oakland
- Add 9 new roundtrips from Oakland to Sacramento
- Add 9 new roundtrips from Sacramento to Roseville, with 3 extending to Auburn
- Reduce travel times by as much as 38 minutes

**Other Benefits**

- Improve ACE service from Fremont to San Jose
- Help future commuter starts
- Provide capacity for service over the Dumbarton Bridge
- Enhance freight mobility

## Commuter Service: Creating Synergies

The Near-term projects outlined in this report must address local, state and regional needs, as well as intercity service goals. The rail network centered on San Jose would provide local, regional and statewide connectivity without interfering with freight operations. Much of this service converges at the San Jose-Diridon terminal, which will need significant investment in order to accommodate planned services. This means including Caltrain and ACE service in the planning process, as well as future VTA commuter service between Union City and San Jose and potential passenger rail service over the Dumbarton Bridge. Service over the Dumbarton Bridge is being studied by the San Mateo County Transit District (SamTrans) and the San Mateo County Transportation Authority. Additionally, efforts are currently underway to evaluate commuter rail service between Davis and Auburn/Colfax and between Solano County and Oakland/San Francisco. The Immediate time frame program focuses over $60 million of improvements to the shared corridor between Hayward (Niles Junction) and Santa Clara. This investment is a first step in creating a dedicated passenger rail corridor between Oakland and San Jose.

## Freight Service: Creating Synergies

UPRR serves five cargo ports between Sacramento and Oakland, with the Port of Oakland representing an increasingly important transfer point for intermodal cargoes. Additionally, a major complex of oil refineries that line San Pablo Bay, owned by Chevron, BP, Union 76, Shell and others, generate significant petrochemical traffic for the railroad. Similarly, UPRR transports trainloads of imported automobiles from the vast unloading lots at Benicia to distribution points throughout the nation.

The Capitol Corridor also forms an essential link connecting UPRR's Interstate 5 Pacific Coast Corridor and transcontinental Central Corridor, as well as providing interchange points with short-line operators at Suisun, Richmond, Davis and West Sacramento.

South of Oakland, UPRR serves important warehousing and manufacturing facilities in the East Bay, chemical plants in Newark and access to the New United Motors plant on the Warm Springs line. While local freight service primarily characterizes the UPRR's use of this line segment, there is, nonetheless, an increasing emphasis on land bridge intermodal traffic.

The Capitol Corridor plan includes adding tracks such as third main track segments and yard bypass tracks between Oakland and Roseville. These projects would have the added benefit of reducing delays to freight trains by allowing both freight and passenger trains to quickly pass slower-moving trains without stopping. In the congested San Jose to Oakland Corridor, the improvements proposed, including a fourth main track between Santa Clara and San Jose, will minimize conflicts between Capitol Corridor, Caltrain, ACE, or future VTA trains and Union Pacific freight trains.

The CCJPA and Amtrak recognize that the Capitol Corridor service is provided through a partnership with the host railroad, UPRR. Involved parties also realize that implementing Near-term improvements will be successful if Amtrak, CCJPA, and UPRR work cooperatively.

## New Routes: Additional Opportunities for Rail Service

#### AUBURN/COLFAX TO RENO EMERGING CORRIDOR

Intercity passenger rail service to Reno, Nevada is envisioned during the life of this plan as an emerging corridor. Improvements proposed under this plan between Sacramento and Auburn/Colfax are the first steps toward this service goal.

A number of studies of upgraded intercity passenger rail service along the Interstate 80 corridor from Sacramento to Truckee to Reno have been made in the last few years. The “Sacramento-Tahoe-Reno Intercity Rail Study, Final Report,” dated August 1995, is the most recent study. This study, conducted by Caltrans District 3 and the Nevada Department of Transportation, examined the feasibility of expanding passenger rail service along the Interstate 80 corridor. The study recommended extending Capitol Corridor service to Reno with one intercity passenger train per day. Recently, the CCJPA has proposed examining up to four trains per day.

Amtrak, Caltrans and CCJPA plan to study service expansion to Reno over the next several years to better quantify ridership potential and challenges to implementing this expanded intercity passenger rail service to Reno.

## Existing Capitol Corridor Conditions

The Capitol Corridor is a 172-mile-long route over the UPRR line from San Jose to Oakland to Sacramento to Auburn/Colfax.

The Capitol and San Joaquin Corridors overlap between Oakland and Martinez. The existing conditions for the overlapping portion of the corridors between Oakland and Martinez are described in this Capitol Corridor section of the report.

There are a large number of grade crossings along the 172-mile Capital Corridor route in an area with a high volume of vehicular traffic and significant population density. A summary of the number and type of grade crossings by subdivision is as follows:

> The Coast Subdivision between Santa Clara and Newark has 21 at-grade rail/highway crossings, 12 of which have active warning devices consisting of bells, flasher signal lights and gates. Nine of these crossings, classified as private crossings, have only stop signs or crossbuck signs.
>
> The Niles Subdivision between Newark and Oakland has 47 at-grade rail/highway crossings, 35 of which have active warning devices consisting of bells, flasher signal lights and gates. Twelve of these crossings, classified as private crossings, have only stop signs or crossbuck signs.
>
> The Martinez Subdivision between Oakland and Sacramento has 66 at-grade rail/highway crossings, 43 of which have active warning devices consisting of bells, flasher signal lights and gates. Of the remaining 23 private crossings, 4 of them have some active warning devices and the remaining 19 have either stop signs or no warning signs. Between Sacramento and Roseville, there are two public crossings, one of which has an active warning device. Of the four remaining private crossings, three have active warning devices.
>
> The Roseville Subdivision between Roseville and Auburn has 17 public and 12 private crossings. All but one of the public crossings has an active safety device. The remaining 12 private crossings have either stop signs or no warning signs.

The existing conditions of the Capitol Corridor infrastructure are briefly described below. A more detailed description of the existing conditions are found in Appendix B – Capitol Corridor Existing Physical Conditions Report.

#### DESCRIPTION OF SUBDIVISIONS

The Coast Subdivision between Control Point (CP) Coast in Santa Clara and Newark, is single track with two sidings. The two sidings are located at Newark (Milepost [MP] 30.80 – MP 32.20) and Albrae (MP 34.00 – MP 34.90). The track structure is mostly 113-pound (lb.) and 119-lb. continuous welded rail (CWR) on timber ties and crushed rock ballast. The signal system on the Coast Subdivision between CP Coast and Newark is CTC.

The Niles Subdivision is double track between Newark and Niles Junction. Between Niles Junction and Elmhurst, the Niles Subdivision is single track with a passing siding at Hayward (MP 18.73 – MP 20.91). The remainder of the Niles Subdivision through Oakland is double track. The track structure is mainly 119-lb. CWR with short segments of 136-lb. CWR on timber ties and crushed rock ballast. On the Niles Subdivision the signal system is CTC between Newark and Elmhurst. Between Elmhurst and CP Strong at 5th Street in Oakland, the signal system is Automatic Block Systems (ABS). The remainder of the Niles Subdivision through Oakland has a CTC signal system.

The Martinez Subdivision is double track, except at the Yolo Causeway. The Yolo Causeway is single track between West Causeway (MP 81.10) and East Causeway (MP 85.20). The Martinez Subdivision was rehabilitated over the last few years, resulting in a track structure of 132-lb., 133-lb. and 136-lb. CWR on timber ties and crushed rock ballast for most of the subdivision. The entire Martinez Subdivision from Oakland to Roseville has a CTC signal system.

The Roseville Subdivision from Sacramento to Auburn/Colfax is entirely double track, although the service to Auburn/Colfax is operated bi-directional on only one of the two main tracks because the tracks are separated by one-half mile. The track structure consists mainly of CWR on timber ties and crushed rock ballast. Concrete ties have been installed in a few locations between Roseville and Reno. The Roseville Subdivision between Roseville and Reno is a combination of CTC and ABS. Most of the route over Donner Summit is ABS, but the single-track alignment segment has CTC.

### STATION FACILITIES

There are 15 passenger train stations on the Capitol Corridor. The details of joint usage, staffing and ownership are listed in Table CA-1.

**Table CA-1**
**Station Facilities**

| Station | Users | Staffed | Station Ownership |
|---|---|---|---|
| San Jose-Diridon | ACE, Caltrain, Amtrak | Yes | PCJPB |
| Great America | ACE, Amtrak | No | UPRR |
| Fremont/Centerville | ACE, Amtrak | No | City of Fremont |
| Hayward | Amtrak | No | UPRR |
| Oakland (Jack London Square) | Amtrak | Yes | Port of Oakland |
| Emeryville | Amtrak | Yes | City of Emeryville |
| Berkeley | Amtrak | No | UPRR |
| Richmond | BART, Amtrak | No | UPRR |
| Martinez | Amtrak | Yes | City of Martinez |
| Suisun-Fairfield | Amtrak, Greyhound | No | City of Suisun |
| Davis | Amtrak | Yes | City of Davis |
| Sacramento | Amtrak | Yes | UPRR |
| Roseville | Amtrak | No | City of Roseville |
| Rocklin | Amtrak | No | UPRR |
| Auburn | Amtrak | No | UPRR |

### LAYOVER AND MAINTENANCE FACILITIES

Capitol Corridor trains lay over at night at San Jose, Sacramento and Auburn station sites and also at the Oakland maintenance facility. Daily inspections and cleaning, periodic maintenance and running repairs are performed on rolling stock at the Oakland maintenance facility.

Locomotives are fueled, sanded and serviced at the fueling station in the West Oakland Yard. Periodic maintenance, such as 92-day federally mandated inspections, and unscheduled maintenance, such as wheel truing, replacement of power assemblies or traction motors, etc., is performed at the Amtrak maintenance facility in Los Angeles.

Most facilities for extensive passenger car maintenance are available at the Oakland maintenance facility.

A new Amtrak locomotive and car maintenance facility is being constructed in Oakland.

## The Capitol Corridor Plan

Specific objectives for the Capitol Corridor include increasing frequency to meet growing passenger demand, reducing travel times and improving operational reliability. To meet its service goals, the Capitol Corridor Task Force developed an integrated capital improvement program that identifies Immediate, Near-term and Vision improvements and projects.

The growth of UPRR freight traffic, along with Amtrak and CCJPA's need to increase regional passenger service requires a physical plant that not only conforms to modern standards for a mixed-use railroad line, but also provides capacity to serve both passenger and freight growth. Developing increased railroad line capacity, therefore, is not a one-dimensional goal, but it has three components: increased speed through plant and signal improvements, additional segments of double track to allow opposing trains to pass each other and to allow fast trains to overtake slower ones without interference and provision of auxiliary tracks to allow the servicing of local industries without causing interference to the flow of through passenger and freight trains.

The groupings of Immediate, Near-term and Vision projects advance a logical building-block approach that would create a service corridor to concurrently meet the needs of passenger and freight customers along this growth market.

The individual improvement projects needed for the Capitol Corridor for the three time frames are listed in Tables CA-3 through CA-5, respectively, along with their estimated cost. A narrative description of each project and location maps are provided following the tables. The overall project costs for the three time frames are summarized in Table CA-2.

**Table CA-2**
**Capitol Corridor 2000 – 2020 Projects Summary List**

| Description | Project Cost (in millions, based on year 2000 dollars) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Project Time Frame** | **Project Devel-opment (PE, EIR/S, CM)** | **Right-of-Way** | **Trackwork/ Structures** | **Sta-tions** | **Signal/ Systems** | **Grade Cross-ings** | **Rolling Stock** | **Total Cost** |
| Immediate Projects Subtotal | 29.55 | 0.00 | 119.64 | 28.33 | 49.97 | 2.15 | 29.70 | **259.34** |
| Near-term Projects Subtotal | 26.17 | 3.94 | 104.88 | 25.76 | 11.09 | 13.15 | 13.35 | **198.34** |
| Vision Projects Subtotal | 105.38 | 82.5 | 590.82 | 20 | 174.42 | 15.77 | 40.95 | **1,029.84** |
| **Capitol Corridor Total** | **161.10** | **86.44** | **815.34** | **74.09** | **235.48** | **31.07** | **84.00** | **1,487.52** |

NOTES: PE: Preliminary Engineering; EIR/S: Environmental Impact Report/Statement; CM: Construction Management

### IMMEDIATE PERIOD

The Immediate projects described below and listed in Table CA-3 are projects identified for implementation on the Capitol Corridor within the next three years.

**Table CA-3**
**Capitol Corridor Immediate Projects List**

| Description | | Project Cost (in millions, based on year 2000 dollars) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Project No. | Project Name | Project Development (PE, EIR/S, CM) | Right-of-Way | Trackwork/ Structures | Stations | Signal/ Systems | Grade Crossings | Rolling Stock | **Total Cost** |
| CA-01 | Auburn/Colfax to Reno Feasibility Study | 1.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **1.50** |
| CA-02 | Sacramento to Auburn/Colfax Track and Signal Upgrades | 2.75 | 0.00 | 12.72 | 0.00 | 9.53 | 0.00 | 0.00 | **25.00** |
| CA-03 | Suisun Bay and Sacramento River Bridge Upgrades | 0.18 | 0.00 | 1.63 | 0.00 | 0.37 | 0.00 | 0.00 | **2.18** |
| CA-04 | Yolo Track Upgrades | 0.02 | 0.00 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | **0.24** |
| CA-05 | Yolo Causeway Second Main Track | 2.86 | 0.00 | 13.61 | 0.00 | 6.36 | 0.00 | 0.00 | **22.83** |
| CA-06 | Dixon Third Main Track | 2.88 | 0.00 | 11.73 | 0.00 | 4.94 | 0.17 | 0.00 | **19.72** |
| CA-07 | Bahia Viaduct Track Upgrade | 0.19 | 0.00 | 2.06 | 0.00 | 0.00 | 0.00 | 0.00 | **2.25** |
| CA-08 | Hercules Station | 0.30 | 0.00 | 0.00 | 2.70 | 0.00 | 0.00 | 0.00 | **3.00** |
| CA-09 | Emeryville Station Improvements | 0.38 | 0.00 | 1.29 | 2.08 | 0.26 | 0.00 | 0.00 | **4.01** |
| CA-10 | Oakland (Jack London Square) Station Capacity Improvements | 2.27 | 0.00 | 8.24 | 7.04 | 4.23 | 0.23 | 0.00 | **22.01** |
| CA-11 | Oakland to San Jose Track Upgrades | 0.62 | 0.00 | 6.00 | 0.00 | 0.00 | 0.00 | 0.00 | **6.62** |
| CA-12 | Hayward Siding Extension | 0.37 | 0.00 | 2.69 | 0.00 | 1.30 | 0.05 | 0.00 | **4.41** |
| CA-13 | Alviso to CP Coast Second Main Track | 2.27 | 0.00 | 13.73 | 0.00 | 1.72 | 0.10 | 0.00 | **17.82** |
| CA-14 | CP Coast to CP Tamien Fourth Main Track | 7.62 | 0.00 | 45.72 | 0.00 | 21.26 | 1.60 | 0.00 | **76.20** |
| CA-15 | Miscellaneous Stations Improvements | 1.71 | 0.00 | 0.00 | 13.84 | 0.00 | 0.00 | 0.00 | **15.55** |
| CA-16 | Rolling Stock | 3.30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 29.70 | **33.00** |
| CA-17 | Passenger Service Enhancements | 0.33 | 0.00 | 0.00 | 2.67 | 0.00 | 0.00 | 0.00 | **3.00** |
| **Subtotal** | | **29.55** | **0.00** | **119.64** | **28.33** | **49.97** | **2.15** | **29.70** | **259.34** |

*Auburn/Colfax to Reno Feasibility Study (CA-01):* A feasibility study for implementing Capitol Corridor passenger train service between Auburn/Colfax and Reno would be conducted. This feasibility study would perform conceptual engineering, assess environmental issues and determine market demand.

*<u>Sacramento to Auburn/Colfax Track and Signal Upgrades (CA-02)</u>:* The growing demand for frequent passenger train services in the Sierra foothills will require an amalgam of track, bridge and signal improvements to bring this developing segment of the Capitol Corridor up to date.

Between Auburn and Elvas in Sacramento, increased operating speeds (60 to 79 mph) would be made possible through a combination of track rehabilitation (rail, crossties and ballast) and increased superelevation (an engineering practice of banking the roadbed on curves to permit higher speeds and less rail/wheel resistance).

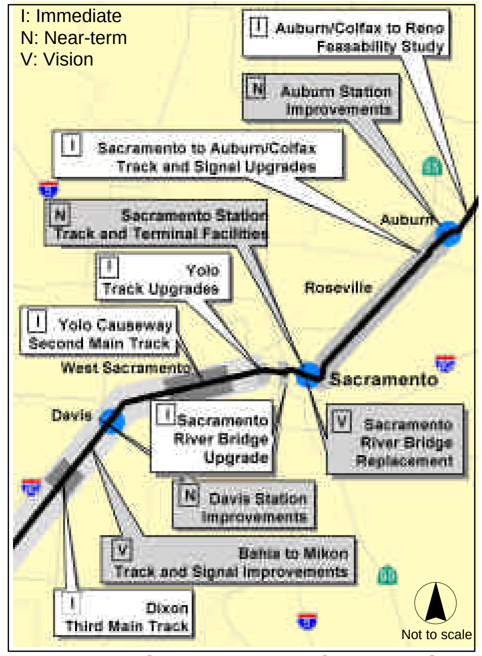



***Figure CA-2: Auburn to Dixon***

Improvements would also be made to the American River Bridge in Sacramento to allow passenger train speeds over the bridge to increase from 25 to 40 mph.

The existing signal system between Roseville and Auburn/Bowman, presently a combination of an outdated ABS system and a comparatively modern CTC signal system, would be upgraded to a state-of-the-art CTC signal system. New or renewed rail/highway grade crossing warning systems would also be installed between Roseville and Auburn/Bowman, consistent with the increased train speeds.

These projects would provide for reduced running times through the track and bridge improvements and improved service reliability through upgrades to the signal system. The capacity of the tracks would likewise improve as the higher speeds would permit more frequent service.

*<u>Suisun Bay and Sacramento Bridge Upgrades (CA-03)</u>:* The frequency of bridge openings for marine traffic at Suisun Bay and the Sacramento River at I Street in Sacramento takes a toll on the reliability of the locking and control mechanisms involved in the daily operation of these bridges. This project would replace and/or rehabilitate key mechanical and electrical components to underwrite the performance of these bridges.

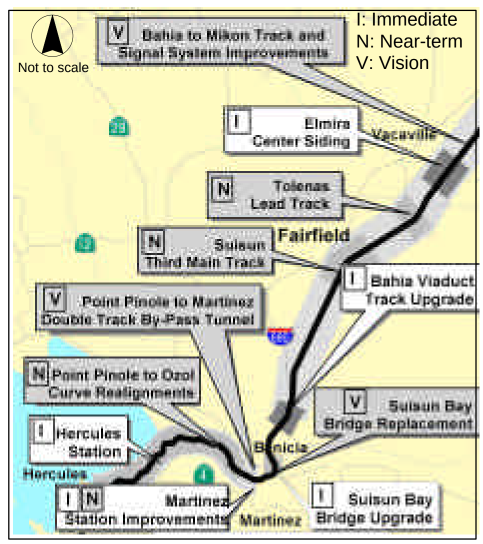



***Figure CA-3: Vacaville to Richmond***

The benefits derived would be twofold: improved railroad operating speeds, reducing running time and reduced delays, owing to periodic mechanical or electrical failures.

*<u>Yolo Track Upgrades (CA-04)</u>:* Because diamonds must necessarily provide a small "gap" to be bridged by the wheels of a train, the wear on this track fixture is pronounced, requiring frequent maintenance. Two miles west of Sacramento, the Yolo Short Line crosses the two tracks of the Capitol Corridor. Through the replacement of these diamonds with an improved design, train speeds would be increased from 40 to 60 mph.

This project would contribute to improved trip times.

*<u>Yolo Causeway Second Main Track (CA-05)</u>:* When the Oakland-Sacramento line was double-tracked, the Yolo Causeway, a four-mile bridge structure over the wetlands east of Davis, was a double-track structure. A number of years ago, as a maintenance economy measure, the bridge was reduced to a single-track operation. With increased demands placed by Capitol Corridor service, Yolo Causeway presents an area of continuing conflict because trains must wait at either West Causeway (MP 81.10) or East Causeway (MP 85.20) while opposing trains traverse the trestlework.

This project would restore the second track to the causeway bridge and upgrade the signal system on both ends of the rehabilitated bridge, providing new high-speed crossover tracks to allow trains to move between tracks without encountering delays.

This newly restored second main track would provide additional capacity, reduce train delays and improve operational reliability.

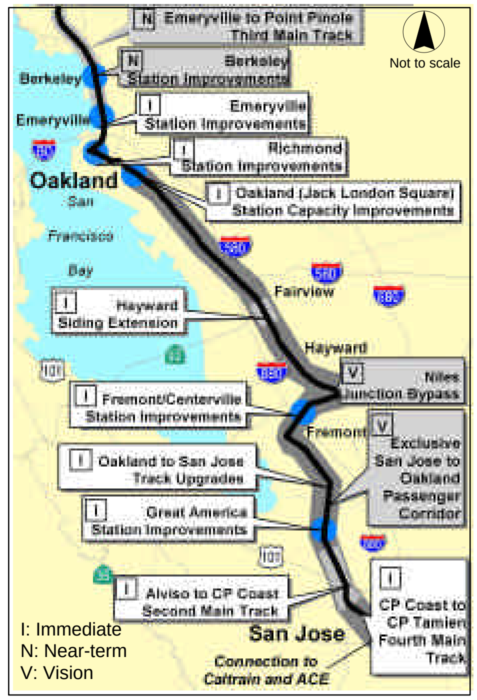



***Figure CA-4: Berkeley to San Jose***

*<u>Dixon Third Main Track (CA-06)</u>:* This improvement project would construct a third main track at Dixon. The frequency, speed and reliability of future Capitol Corridor service requires the blend of infrastructure improvements that would not only adequately underwrite passenger service, but would provide sufficient capacity improvements to protect the reliability of time-sensitive freight shipments. To this end, two segments of third track, at Dixon and Elmira, would provide for high-speed overtakes of slower-moving freight trains. These tracks, designated as center sidings, would be located between the two existing main tracks. The project would include the new track structure, as well as the necessary signal appliances to permit trains to move seamlessly in and out of the flow on the main tracks to overtake freight trains. These tracks would contribute to increased reliability.

*<u>Bahia Viaduct Track Upgrade (CA-07)</u>:* The Bahia Viaduct is located immediately on the Sacramento side of the bridge over Suisun Bay, four miles east of Martinez. This track and bridge improvement upgrades the Bahia Viaduct between MP 35.70 and MP 37.10 to eliminate the existing speed restrictions, increasing train speeds to 60 mph on the viaduct. The project upgrades include replacement of approximately 1,000 ties, adding ballast and a track-resurfacing program. Additionally, the track on the bridge would be rehabilitated.

Eliminating the speed restrictions on this viaduct would improve travel time, as well as reduce maintenance outages.

*<u>Hercules Station (CA-08)</u>:* To attract new customers and meet ridership demand in this San Pablo Bay/Franklin Canyon area, a new passenger rail station is planned for Hercules (MP 23.80). This project would construct platforms and canopies, parking and station access and station and passenger service facilities.

*<u>Emeryville Station Improvements (CA-09)</u>:* Improvements at Emeryville Station (MP 4.50) would include the extension of the existing station track at Emeryville by 3,000 feet, between MP 3.70 and MP 4.20, to speed trains through the station and improve freight train mobility. Station improvements at Emeryville would include extending the existing platform southward by 400 feet to under the Powell Avenue Bridge, which would increase capacity, improve flexibility and reduce station dwell time, which would reduce overall trip time.

This work would enhance recent station improvements at Emeryville, whose importance is growing daily as a major business travel destination for nearby biotech research and development facilities.

*<u>Oakland (Jack London Square) Station Capacity Improvements (CA-10)</u>:* Amtrak's station facilities at Jack London Square would be redesigned to permit the operation of two passenger trains simultaneously. This improvement would construct a new 1,600-foot-long third track between MP 6.40 and MP 7.00 and provide for separate parallel freight movements by extending and upgrading the existing Hanlen industrial freight track. Switches and crossovers would be installed to allow for parallel movements from the crossovers at Magnolia to CP Strong, a switching point adjacent to East Oakland yard. The rebuilt Jack London facility would be able to accommodate longer Amtrak trains (including the California Zephyr, presently terminating at Emeryville) and would provide the capacity necessary to support enhanced Capitol Corridor and San Joaquin Corridor service.

The project would increase track capacity to support added passenger trains and enhance reliability by reducing the frequency and extent of delays resulting from local freight operations through downtown Oakland.

*Oakland to San Jose Track Upgrades (CA-11):* This project would upgrade existing track between Oakland/San Francisco and San Jose to improve travel time and increase operational reliability. At Elmhurst (MP 13.50) 0.38 mile of new CWR would be installed. Between Newark (MP 31.60) and CP Coast (MP 44.70 in Santa Clara), existing track would be rehabilitated. The rehabilitation would include tie replacement, ballasting and track resurfacing and realigning. In addition, within this territory the track substructure would be rehabilitated from MP 34.83, north of the wetlands preserve community of Drawbridge, to MP 39.90, south of Alviso, with subgrade stabilization, ballast cleaning, drainage improvements and bridge improvements.

Two benefits would be derived from this project: improved running times and fewer maintenance outages through roadbed stabilization procedures, primarily in the areas adjacent to the wetlands.

*Hayward Siding Extension (CA-12):* Hayward Station is presently served by one track. This requires a second passenger train (in those instances where the schedules overlap) to wait until the first train has departed. By extending the present siding one mile south and building a second passenger platform (see project CA-15), Hayward could serve two trains moving in opposite directions at the same time. Included in this extension from MP 20.90 to MP 21.90 would be the appropriate signal and switch improvements to maintain high-speed and reliable operations through the area.

This project would provide needed capacity to support future Capitol Corridor service frequencies.

*Alviso to CP Coast Second Main Track (CA-13):* The construction of a 4.80-mile-long second main track would further support passenger train growth in the Silicon Valley, from Alviso (MP 39.90) to CP Coast (MP 44.70 in downtown Santa Clara). Requisite high-speed switches and an all new signal system would be provided for the new double track line. A substantial part of this project would be the reconstruction of new bridges, as well as carefully engineered roadbed redesign in the complex highway intersection of the Central Expressway, U.S. Highway 101 and Lafayette Street. Great America Station, an important transfer facility to the VTA light-rail system, would receive a second platform (see project CA-15), permitting the simultaneous operation of two trains. Great America is jointly used by Amtrak and ACE (Altamont Commuter Express) trains.

This project would increase capacity and operational reliability.

*CP Coast to CP Tamien Fourth Main Track (CA-14):* San Jose's importance as a destination increases every year. The San Jose-Diridon station complex, designed initially to support a handful of intercity trains and a modest level of commuter service to San Francisco, has grown into a major regional passenger hub. San Jose-Diridon will also be called on to host future VTA light-rail service, increased ACE service, and increased commuter service to both San Francisco and Gilroy. Other regional services included in this study would bring new services to and from Hollister, Salinas, Monterey and Los Angeles.

The infrastructure must adequately segregate these services, as well as provide for existing through and local freight services from San Jose to points north and south. To contribute to the segregation of the competing services that must weave through a narrow center-city corridor, this project construct a 4.80-mile-long fourth main line track, from CP Coast (MP 44.70 in Santa Clara) to CP Tamien (MP 49.50 in San Jose).

This fourth main track would be constructed on new embankment to high-speed standards and include a total of seven new bridges. Appropriate switch and signal improvements would be part of this major infrastructure improvement. The benefits derived included reduced terminal congestion, greater reliability, reduced trip times and the ability to provide more frequent passenger service to San Jose-Diridon Station.

The territory between CP Coast and San Jose-Diridon Station is expected to accommodate up to 200 weekday train movements, once the Joint Powers Board completes their new Maintenance Facility (CEMOF) at Lenzen Avenue, MP 46.20. Increasing numbers of trains from Caltrain (revenue and deadhead), ACE, Amtrak and UPRR will require even more capital investment in the long term as services increase. Additional trackage may also be needed between San Jose-Diridon Station and CP Michael in the future due to added Gilroy, Coast Corridor and UPRR movements.

*Miscellaneous Stations Improvements (CA-15):* Facility and parking improvements would be made at several stations to insure that station facilities offer the greatest amenities as well as convenience. As mentioned in conjunction with second track projects, Hayward and Great America would receive second platforms. Recently completed work on UPRR's Centerville line (in conjunction with the introduction of ACE service in 1998) has provided a second track between Niles Junction and Newark. Under this station improvement project, a second platform would be constructed at Fremont/Centerville station to maximize the utility of this second track. Other improvement work would include new station facilities and expanded parking at Richmond.

These improvements would contribute to improved passenger comfort, attractiveness to new riders through enhanced parking and overall service reliability.

*Rolling Stock (CA-16):* This project would purchase two modern trainsets with locomotives, needed to operate the increased frequencies proposed within the Immediate time frame.

*Passenger Service Enhancements (CA-17):* New ticket vending machines, real-time message boards and automated fare collection systems would be installed to enhance customer service.

### NEAR-TERM PERIOD

Near-term projects, listed in Table CA-4, have been identified and recommended to achieve the four- to eight-year service goals for the Capitol Corridor, while making a significant investment towards the goals of the twenty-year vision for the corridor.

**Table CA-4**
**Capitol Corridor Near-Term Projects List**

| Description | | Project Cost (in millions, based on year 2000 dollars) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Project No. | Project Name | Project Devel-opment (PE, EIR/S, CM) | Right-of-Way | Track-work/ Struc-tures | Stations | Signal/ Systems | Grade Crossings | Rolling Stock | **Total Cost** |
| CA-18 | Sacramento Station Track and Terminal Facilities | 3.08 | 0.00 | 7.57 | 10.46 | 2.88 | 0.43 | 0.00 | **24.42** |
| CA-19 | Tolenas Lead Track | 0.68 | 0.00 | 2.63 | 0.00 | 2.16 | 0.01 | 0.00 | **5.48** |
| CA-20 | Suisun Third Main Track | 1.30 | 0.00 | 7.19 | 0.00 | 2.32 | 0.03 | 0.00 | **10.84** |
| CA-21 | Point Pinole to Ozol Curve Realignments | 10.81 | 3.94 | 71.30 | 0.00 | 2.12 | 0.06 | 0.00 | **88.23** |
| CA-22 | Emeryville to Point Pinole Third Main Track | 2.81 | 0.00 | 16.19 | 0.00 | 1.61 | 0.16 | 0.00 | **20.77** |
| CA-23 | Miscellaneous Stations Improvements | 4.30 | 0.00 | 0.00 | 15.30 | 0.00 | 0.00 | 0.00 | **19.60** |
| CA-24 | Rolling Stock | 1.65 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 13.35 | **15.00** |
| CA-25 | Safety and Mobility Enhancements | 1.54 | 0.00 | 0.00 | 0.00 | 0.00 | 12.46 | 0.00 | **14.00** |
| **Subtotal** | | **26.17** | **3.94** | **104.88** | **25.76** | **11.09** | **13.15** | **13.35** | **198.34** |

*Sacramento Station Track and Terminal Facilities (CA-18):* The growth of Sacramento as both an employment magnet and the seat of California government requires the development of a new Sacramento Station (MP 89.00) adjacent to the current station. This new facility, developed in concert with the city's redevelopment plans, would provide for the segregation of passenger and freight movements through the station, permitting Capitol Corridor trains as well as trains from Bakersfield on the San Joaquin Corridor to eliminate passenger exposure to passing freight trains. The new station would have four tracks, served with 1,200-foot-long passenger platforms (designed to handle corridor service as well as long-distance service from Chicago, Los Angeles and Seattle), all-weather canopies and on-site parking. The facility plan would include a modern signal system and would create a true full-service transportation center for Sacramento, with convenient access to an extension of the Sacramento Regional Transit light-rail system.

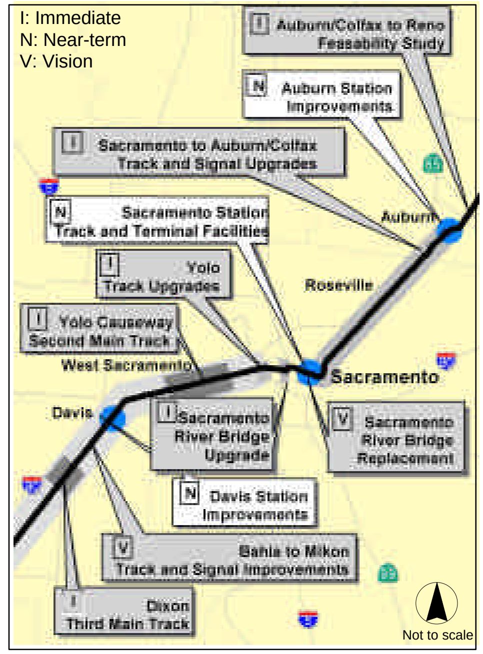



*Figure CA-5: Auburn to Dixon*

<u>Tolenas Lead Track (CA-19)</u>: Tolenas, located approximately three miles east of the Suisun-Fairfield Amtrak station, presents another opportunity to enhance operations along the Capitol Corridor by reducing potential conflicts between local freight trains, Corridor passenger trains and through freight trains. This project would extend and rehabilitate the existing freight lead track east and west of Tolenas to create a new 1.67-mile-long lead track. New higher-speed switches would be installed to allow local freight trains to move out of the way of priority passenger and freight trains and to provide these local freights with a separate dedicated track to service the several industrial concerns sited in this area.

The benefits of this project would be improved operational reliability, increased capacity and reduced trip time by allowing passenger trains to pass freight switching operations.

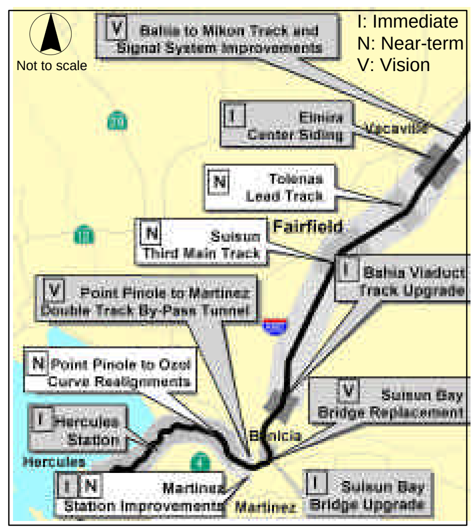



*Figure CA-6: Vacaville to Richmond*

<u>Suisun Third Main Track (CA-20)</u>: The California Northern Railroad is a major customer of the UPRR at Suisun-Fairfield. When freight cars are delivered or picked up from the California Northern, the northernmost main track is blocked in the process, requiring other trains to “detour” to the other track. This creates delays and, at times, congestion through the area. This improvement project would construct a third track at Suisun, 2.40 miles long, from MP 47.40 to MP 49.80, to serve as a freight switching lead track for the industrial trackage in the area. The new third track would be located on the north side of the existing double track main line. Several existing turnouts would require relocations and some existing industrial trackage alignments would be modified to accommodate the new third track. Modifications to the CTC signal system would also be included.

The benefit of this project would be improved operational reliability.

<u>Point Pinole to Ozol Curve Realignments (CA-21)</u>: The Capitol Corridor follows a route with multiple speed restrictions, hugging the coast of San Pablo Bay for 16 miles between Point Pinole and Ozol, one mile west of Martinez. The curves along this route limit train speeds to the 40- to 50-mph range. This improvement project would realign many of these curves to allow higher speeds on passenger trains. In addition, where practicable, new bridges and earthwork fills would be constructed to allow for speeds approaching 70 mph.

This project would reduce trip times.

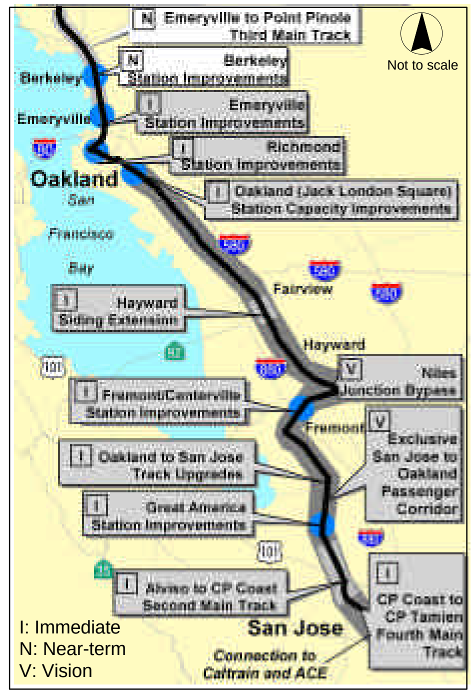



***Figure CA-7: Berkeley to San Jose***

*Emeryville to Point Pinole Third Main Track (CA-22):* A third track currently exists on the west side of the existing UPRR main line between Emeryville and Point Pinole. Due to deteriorated conditions on this track, its present use is limited. By upgrading this track to FRA Class 5 track standards, the Capitol Corridor would effectively become a three-track main line between Emeryville (MP 5.00) and Point Pinole (MP 14.90). Signal improvements would be built into this new track as part of the CTC signal system to effectively transform this industrial track into a higher-speed main line track.

This project would help to eliminate potential conflicts between passenger trains and intermodal and merchandise freight trains moving to the Port of Oakland.

*Miscellaneous Stations Improvements (CA-23):* This project would make improvements to Berkeley Station (MP 6.30), Davis Station (MP 75.50), and Auburn Station (MP 124.20). This project would add parking and additional platforms at the Davis and Berkeley Stations.

*Rolling Stock (CA-24):* This project would fund the acquisition of a third new trainset, including the locomotive to make full use of the capacity improvements described in the Near-term plan.

*Safety and Mobility Enhancements (CA-25):* This project would evaluate the 169 rail/highway crossings along the corridor to determine optimum solutions to enhancing highway safety. These improvements would contribute to reduced traffic congestion on local streets by designing ways to improve public motorist safety and convenience through improved roadway approaches to crossings, selective road widenings at crossings and new signal technologies to provide the maximum warning time with the least disruption to local traffic. A portion of the funding would support efforts to improve high priority crossings. Amtrak, CCJPA and UPRR are committed to working with local communities to eliminate highway/rail crossings and to identify mitigation measures. These projects would enhance community safety while supporting increased rail traffic on the Corridor.

### VISION

Vision projects listed in Table CA-5 and described below are those projects, which would be implemented over a nine- to twenty-year period to meet the twenty-year service and trip time goals for the Capitol Corridor.

**Table CA-5**
**Capitol Corridor Vision Projects List**

| Description | | Project Cost (in millions, based on year 2000 dollars) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Project No. | Project Name | Project Development (PE, EIR/S, CM) | Right-of-Way | Track-work/ Structures | Stations | Signal/ Systems | Grade Crossings | Rolling Stock | **Total Cost** |
| CA-26 | Sacramento River Bridge Replacement | 5.43 | 0.00 | 49.90 | 0.00 | 4.36 | 0.00 | 0.00 | **59.69** |
| CA-27 | Bahia to Mikon Signal System Improvements | 7.10 | 0.00 | 0.00 | 0.00 | 16.75 | 10.77 | 0.90 | **35.52** |
| CA-28 | Suisun Bay Bridge Replacement | 13.10 | 0.00 | 124.49 | 0.00 | 6.54 | 0.00 | 0.00 | **144.13** |

**Table CA-5 (continued)**
**Capitol Corridor Vision Projects List**

| Description | | Project Cost (in millions, based on year 2000 dollars) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Project No. | Project Name | Project Devel-opment (PE, EIR/S, CM) | Right-of-Way | Track-work/ Structures | Stations | Signal/ Systems | Grade Crossings | Rolling Stock | **Total Cost** |
| CA-29 | Point Pinole to Marti-nez Double Track By-pass Tunnel | 41.25 | 0.00 | 334.13 | 0.00 | 37.12 | 0.00 | 0.00 | **412.50** |
| CA-30 | Exclusive San Jose to Oakland Passenger Corridor | 19.80 | 80.00 | 48.80 | 20.00 | 24.40 | 5.00 | 0.00 | **198.00** |
| CA-31 | Niles Junction Bypass | 5.50 | 2.5 | 33.50 | 0.00 | 11.00 | 0.00 | 0.00 | **52.50** |
| CA-32 | Rolling Stock | 4.95 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 40.05 | **45.00** |
| CA-33 | High-Speed Dispatch-ing System | 8.25 | 0.00 | 0.00 | 0.00 | 74.25 | 0.00 | 0.00 | **82.50** |
| **Subtotal** | | **105.38** | **82.50** | **590.82** | **20.00** | **174.42** | **15.77** | **40.95** | **1,029.84** |

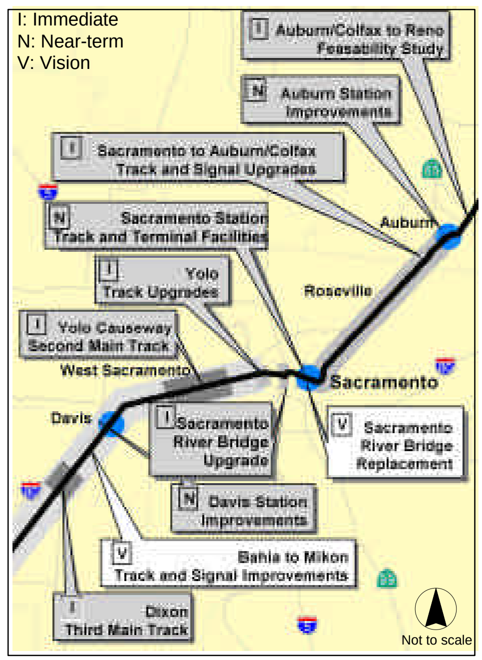



***Figure CA-8: Auburn to Dixon***

*Sacramento River Bridge Replacement (CA-26):* U.S. maritime law specifies that marine traffic on inland waterways has precedence over both railroads and highways. Modern highway engineering has virtually eliminated this conflict on modern freeways and interstate highways. Many railroad bridges, constructed in earlier eras, still have moveable spans to allow for ship movements. The bridge across the Sacramento River at MP 89.00 frequently opens to permit passage of river traffic. By constructing a non-moveable bridge at a higher grade west of Sacramento Station, both rail passenger and freight traffic would move unimpeded through the Capitol district and ship traffic would be freed of the potential for delay from trains stopped on the bridge.

This project would permanently eliminate these random, yet frequent, delays to railroad traffic, enhancing the reliability of both passenger and freight trains.

*Bahia to Mikon Signal System Improvements (CA-27):* In the nearly fifty miles between Bahia (MP 38.00) and Mikon (MP 86.93), located between Benicia and Sacramento, the Capitol Corridor has few curves and runs over nearly level terrain. This stretch of track lends itself to high-speed running that would contribute to reduced trip times. To achieve the high-speed goals of 110 mph, a modern cab signal system with automatic train control speed enforcement would be installed. In addition, necessary enhancements to the rail/highway grade crossing warning systems would be provided to provide a uniform warning time for trains operating at 110 mph and at slower speeds. This project would contribute to reduced running times proposed within the Vision time frame.

*Suisun Bay Bridge Replacement (CA-28):* Similar in concept to the Sacramento River Bridge project, the long-term replacement of the Suisun Bay lift span would benefit future operations on the Capitol Corridor. Because ship movements through this busy industrial channel can occur at any time, delays to passenger and freight movements would be eliminated if a bridge were constructed at a higher grade. This project would require significant investment to integrate the new railroad structure into the industrial facilities and highway bridge approaches. This major project would contribute to both service reliability and reduced running times.

<u>*Point Pinole to Martinez Double Track Bypass Tunnel (CA-29)*</u>*:* This project would raise train speeds along San Pablo Bay between Point Pinole and Martinez, which are restricted by tight track curvature. The project would construct a new six-mile-long double-track bypass tunnel between the west end of Ozol Yard (MP 30.00) and the Pinole/Hercules area (MP 21.00). The tunnel would enable the line to bypass the restrictive track curvature along San Pablo Bay and rejoin the existing alignment at MP 21.00.

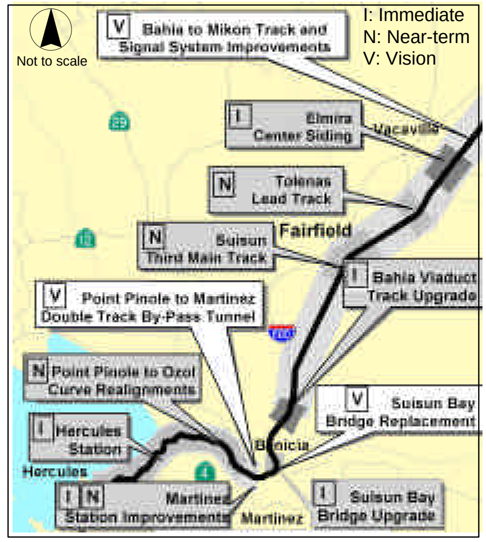



***Figure CA-9: Vacaville to Richmond***

<u>*Exclusive San Jose to Oakland Passenger Corridor (CA-30)*</u>*:* Three separate parallel rail corridors between Oakland and San Jose currently exist. This project would convert one or a combination of these corridors to an exclusive passenger train corridor between Oakland and San Jose.

Implementing this project would eliminate existing passenger/freight train conflicts and permit future schedule expansions.

<u>*Niles Junction Bypass (CA-31)*</u>*:* This project would reduce from ten to five degrees, the curvature of the wye track at Niles Junction (MP 29.80) that connects the UPRR's Centerville Line to the their Hayward Line. The project would construct a new bypass track, 2,500 feet in length, with two No. 20 powered turnouts and a new 500-foot-long railroad bridge over Alameda Creek. The project would require right-of-way acquisition.

The benefit of this project would be reduced travel time and increase capacity for additional trains and improved reliability.

<u>*Rolling Stock (CA-32)*</u>*:* This project would purchase three modern trainsets with locomotives, needed to operate the increased frequencies proposed within the Vision time frame.

<u>*High-Speed Dispatching System (CA-33)*</u>*:* This project would provide a high-speed dispatching system within high train-speed segments of the Capitol Corridor. This high-speed train dispatching system would perform train-dispatching functions with pre-programmed logic. The train dispatcher would monitor the system and would only intervene when necessary for special or extraordinary circumstances. Such a system would provide faster and more accurate train dispatching decisions and, therefore, would provide for a more reliable operation than is normally possible with human dispatching.

# Analysis Methodology

### RIDERSHIP MODELING

The increased frequencies and reduced travel times outlined in this plan would have a major impact on the market position of the Capitol Corridor. The passenger growth outlined in this plan, accelerated by these improvements, has three major components: growth due to increased population and economic activity, induced trips and, most important, diversions from the automobile. The increased frequencies would tend to generate additional rail short-distance trips, while faster travel times would have a greater impact on the generation of long-distance trips. Both of these factors would generate additional induced trips. The expansion of frequencies to San Jose would generate a large increase in trips to the metropolitan area. The overall improvement in rail service would aid in meeting the transportation needs generated by the increased traffic congestion and population growth in Northern California.

In order to focus exclusively on the impact of frequency and faster travel times, current fares were assumed. However, Amtrak's experience in the Northeast Corridor and the Pacific Northwest Corridor clearly indicates that improved services can support higher passenger yields.

### OPERATIONAL MODELING

The network model for the 2005 service scenario represents the typical conditions for train operations given the infrastructure improvements that are forecast to be in place by that time. While additional modeling efforts did not continue beyond the 2008 time horizon, it is expected that train delays would continue to decrease as further improvements are developed for continued enhancement of train operations. The benefits that would be realized for the Capitol Corridor are based on a well-defined set of infrastructure improvements resulting in increased capacity, reduced maintenance costs and/or enhanced reliability and reduced trip time.

These infrastructure improvements represent a significant step in upgrading the physical plant in Northern California and responding to the increased demand on California's passenger and freight railroads. Continued cooperation and coordination between Amtrak, CCJPA, the freight railroads and the commuter railroads are important in order to fully experience the benefits proposed in this plan. The growing demand on the rail infrastructure of the Capitol Corridor requires a dynamic train scheduling process that considers the projections for service as modeled for this plan along with the flexibility to be sensitive to future service changes from the various rail operators on the corridor.

To obtain the most accurate future operations scenarios, information on planned operations was requested from all rail operators in the Capitol Corridor. In 2005, service adjustments would need to be made based on current operations to ensure reliability of all services in the Capitol Corridor. This process will continue to require ongoing coordination as other services are introduced. Certain schedule adjustments can be expected based on the necessity to integrate all operators' schedules.

Incremental benefits such as additional capacity and increased speeds would certainly accrue once the related infrastructure improvements were in place. Each year through 2005, Amtrak and its partners will be reevaluating the physical plant and adjusting service improvements and schedule times until the 2005 service levels are reached. Passengers would experience these incremental benefits, such as improved reliability and reduced trip time, as the projects are implemented.

#### Service

Berkeley Systems RTC simulation software was used to identify reductions in trip time for the Capitol Corridor. Detailed physical and operational attributes of the corridor were built into the model as part of the development of a fully integrated rail network for the entire state. These infrastructure characteristics were coded into the model, as described in the Capitol Corridor Project List in this section, according to the project's associated planning horizon.

Service frequencies for this corridor were based on forecasted passenger demand. That demand calls for ten daily roundtrips between San Jose and Oakland by 2005, an increase from four daily roundtrips in 2000. The demand also calls for twelve daily roundtrips between Oakland/San Francisco and Sacramento, an increase from the seven daily roundtrips in 2000. In addition, eight of the twelve daily roundtrips would serve Roseville. Freight train movements in this corridor were modeled as provided by UPRR at 2000 service levels.

The stringline graph (Figure CA-10) represents train movements from CP New Castle (near Roseville) to East Albrae (near San Jose) along the Capitol Corridor. Thirty-six passenger trains run on this corridor over a 24-hour period; most of the train meets are well orchestrated, with many occurring near Sacramento or between Martinez and Oakland (Jack London Square).

The simulation effort conducted as part of this study involves development of three important component analytical results: stringline graphs, animation, and performance statistics.

Stringlines are a graphic display of the train movements on the corridor and provide a representation of train meets, in this case the trains running on the Capitol Corridor. The stringlines vividly show whether the passenger trains would make reasonably well-timed meets with other trains on the corridor. With passenger trains having priority over freight trains, they are simulated to receive the least amount of delay minutes compared with freight trains on the corridor. Resolution of train conflicts is a result of analyses based on stringline observations and dynamic animation.

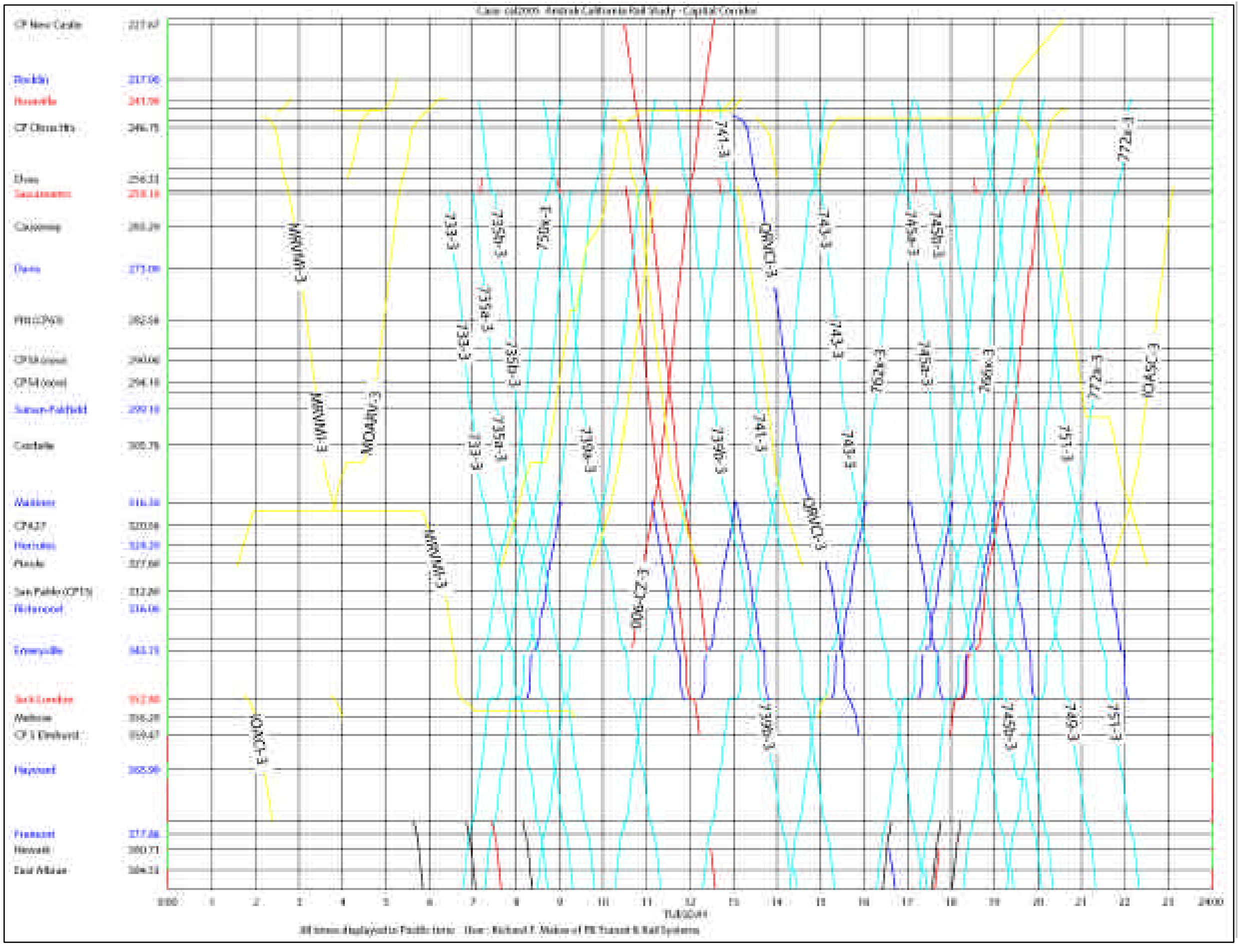


***Figure CA-10: Capitol Corridor Stringline Diagram***

Animation is an important visual tool for observing train movements in the simulation. This utility provides the modeler with the ability to determine whether the train dispatching associated with the infrastructure improvements would actually contribute to enhanced train movements. Once the stringlines were created, adjustments in the animation were made. For example, in some cases, the trains may use a track that is not the best track to occupy from an operational perspective. When this happens, the modeler has the ability to adjust the simulation to include an infrastructure characteristic that influences the train to operate along a route that would likely result from the most logical dispatching dynamics. The modeling reflects the decisions a dispatcher would make for the most effective operating scenario.

With stringlines and animation of the corridor in place, the following performance statistics were developed by train type and corridor:

- The number of trains
- The average speed of the particular train
- The total train miles
- The delay minutes per 100 train miles

These statistics were developed while evaluating service and running time goals for the Capitol Corridor.

The trip time results of a full dispatch simulation model run for 2005 are shown in Table CA-6. The 2000 times are from Amtrak's 2000 timetable. The 2005 run times represent the trip times resulting from improvements implemented in a five-year time frame. The shortest times represent a trip time with minimal interference between train movements, while the longest trip times reflect dynamics such as the effects of increased freight train movements requiring passenger trains to be slowed at certain locations along the particular segment.

**Table CA-6**
**Capitol Corridor RTC Model Run Results**

| | Actual 2000 | RTC Shortest Results | RTC Longest Results | Five-Year Plan 2005 Goal (Near-term) |
|---|---|---|---|---|
| San Jose - Oakland | 1 hr., 3 min. | 49 min. | 51 min. | 58 min. |
| Oakland - Sacramento | 1 hr., 48 min. | 1 hr., 36 min. | 1 hr., 38 min. | 1 hr., 38 min. |
| San Jose - Sacramento | 2 hrs., 51 min. | 2 hrs., 25 min. | 2 hrs., 29 min. | 2 hrs., 36 min. |
| Roseville - Sacramento | 34 min. | 20 min. | 23 min. | 25 min. |

As evident in the simulation trip time results shown in Table CA-6, implementing the projects would provide the means by which freight trains could operate in harmony with passenger train movements over this corridor. The overall outcome would be that both freight and passenger services would run reliably, with minimal delays. As displayed on the stringline chart (Figure CA-10), the train movements shown indicate that the infrastructure improvements in the immediate-term plus the projects from the first two years of the Near-term time frame (through 2005) would provide sufficient capacity to reliably operate the volume of trains forecasted.

## Environmental and Community Considerations

The 20-Year Improvement Plan includes construction and implementation of rail improvements within the Capitol Corridor. Depending on funding, location, nature of construction, and related environmental impacts, it is anticipated that improvements would require environmental review in accordance with the California Environmental Quality Act (CEQA) and/or the National Environmental Policy Act (NEPA). The preliminary environmental evaluation of the proposed improvements for this corridor can be found in the Capitol Corridor Recommended Improvement Projects Summary, Appendix N.

Many of the proposed Capitol Corridor improvements may be Categorically Excluded from NEPA and/or Statutorily or Categorically Exempt from CEQA. If after further evaluation any improvements are found to have potentially significant adverse effects on the environment, more in-depth environmental documentation may be required.

Projects will be designed to minimize impacts within the corridor. Many of the proposed improvements within the Capitol Corridor would be contained within existing right-of-way and would have minimal adverse environmental impacts. Some improvements could potentially have impacts associated with widening and extending crossings at rivers, creeks, streams and tidal wetlands, including San Pablo Bay and Alameda Creek. Crossings would potentially have significant impacts on riparian areas and sensitive biological habitats, particularly within the tidal and non-tidal wetlands. There are also several improvements that would be within the Coastal Zone.

There would also be potential direct and indirect impacts to parks and recreational facilities and potential impacts to cultural resources, such as the historic Hercules area company town and the Sacramento Southern Pacific Railroad shop facilities. Direct impacts may include limited acquisition while indirect impacts include noise and visual impacts. Hazardous materials remediation at the shop facilities site would also be extensive.

Other constraints faced by some of the improvements would include seismically active areas and soils. In addition, there would be potential impacts on water quality due to erosion and storm run-off.

Several of the improvements would result in residential impacts that may affect low-income and/or minority populations. Some of the impacts include traffic effects during construction and operation, increased noise levels, and visual impacts resulting from loss of vegetation. Some improvements would also result in impacts to property access. Several of the improvements located within urban areas may result in impacts to local roadways. Improvements often have positive impacts such as recent station developments at Emeryville and Oakland (Jack London Square).

Improvements within this corridor may require coordination/permits from any or all of the following: California Public Utilities Commission, California Coastal Commission, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, California Department of Fish and Game, State Historic Preservation Officer and U.S. Department of the Interior. For example, additional coordination would likely occur regarding improvements along the margins of San Francisco Bay and San Pablo Bay with the East Bay Regional Parks, Bay Conservation and Development Commission and National Marine Fisheries Service.

# Results of the Plan

This planning effort used stakeholder outreach, ridership modeling tools and technical operational and engineering analysis to develop the appropriate train frequencies, travel times, operational reliability and the supporting infrastructure improvements required to meet the growing demand for service in the Capitol Corridor.

The plan calls for hourly service between San Jose and Sacramento with travel time of less than two and one-half hours, and for increased service to the Foothill communities northeast of Sacramento. Implementing the 20-year plan would reduce the average running time between San Jose and Sacramento by 20 percent compared to existing travel times. With the increased service and reduced trip times, annual ridership would increase from the current 768,000 to over 3.10 million. The 20-year plan identifies $1.48 billion for infrastructure improvements, additional rolling stock and further analysis for route extensions.

### TRAIN FREQUENCY

In order to attain the service objectives of the 20-year plan, which are market-driven and based on ridership analysis, it was necessary to develop infrastructure improvements that would function as a cohesive whole rather than as a group of disjointed projects. Therefore, the customer would have reliable service at fixed, frequent and predictable intervals and in most cases, hourly. As a result, this unified set of infrastructure improvements would allow Amtrak and the CCJPA to offer a more marketable schedule that would appeal to a broader segment of travelers.

With Amtrak, CCJPA, UPRR, ACE and BNSF trains on the Capitol Corridor, it is essential that the projects proposed in the 20-year plan be implemented to meet future service goals. The plan calls for five additional roundtrips running on this corridor by 2005, and four additional roundtrips by plan completion. Several Immediate projects, such as the reconfiguration of the stations at Oakland’s Jack London Square (CA-10) and Emeryville (CA-09), the restoration of the second track on the Yolo Causeway (CA-05), and the addition of a second track (CA-13) and fourth track (CA-14) in the Silicon Valley would increase capacity and improve operational reliability on the corridor. Near-term projects, such as the third main track between Emeryville and Point Pinole (CA-22) and the reconfiguration of Sacramento Station (CA-18) would enhance the existing infrastructure to create additional capacity and allow additional trains. Certain Vision projects, such as bridge replacements in Sacramento (CA-26) and Suisun Bay (CA-28) and the Point Pinole-Martinez tunnel (CA-29), would contribute to increased frequency of service in the corridor.

### TRAVEL TIME

A key component of ridership growth is travel times competitive with other modes of travel. The infrastructure improvements proposed in the 20-year plan would add capacity, increase speeds, reduce station dwell times and relieve critical choke-points, which would significantly reduce travel times. The near term projects wouldd provide a significant benefit to travel times, with possible reductions of ten minutes between San Jose and Oakland, ten minutes between Oakland/San Francisco and Sacramento, twenty minutes between San Jose and Sacramento, and ten minutes between Roseville and Sacramento, all by 2005. Additional Near-term projects that would further benefit travel times include the Bahia to Mikon Signal System Improvements (CA-27) and the Suisun Bay Bridge Replacement (CA-28). Significant Immediate projects that would have an impact on travel times include infrastructure upgrades in the Sacramento to Auburn/Colfax Track and Signal Upgrades project (CA-02) and the Bahia Viaduct Track Upgrade (CA-07).

### OPERATIONAL RELIABILITY

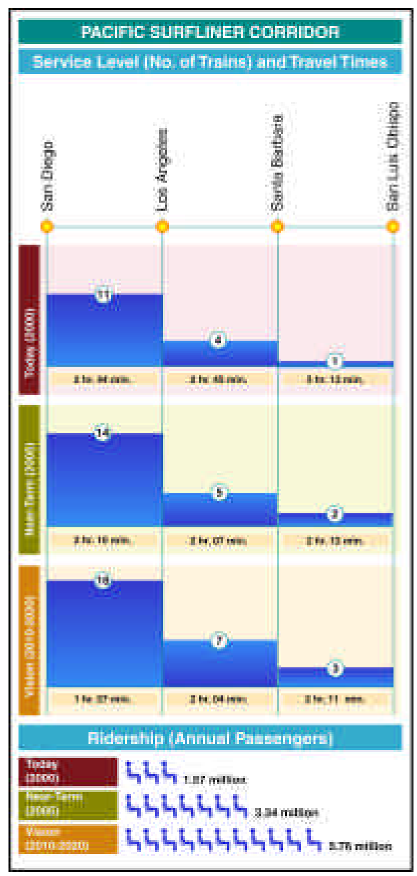
The 20-year plan identifies a blueprint of improvements that would allow passenger and freight providers to consistently adhere to schedules and to reliably deliver the expected level of service. The limitations of the infrastructure in place require scheduling passenger trains to include excessive recovery time to compensate for these deficiencies. This is especially important along the mixed-use Capitol Corridor, where different types and classes of trains must compete with each other for operating windows. The challenges presented by the diversity of services have hindered the development of consistent schedules within the framework of current service schedules. The investments in the 20-year plan would address and overcome these deficiencies so that schedules could be developed and reliably operated.

# Southern California

## Pacific Surfliner Corridor


***Figure PS-1: Pacific Surfliner Corridor***

The Pacific Surfliner Corridor is the state's most highly developed service. Second only to Amtrak's Northeast Corridor in ridership, the service carries more than 1.5 million passengers annually. From San Diego to San Luis Obispo, the Pacific Surfliner Corridor serves Southern California's key coastal population centers and connects two of the most congested regions in the country – Los Angeles and San Diego. Increasing passenger train service between expanding economic centers helps maintain mobility in the region's transportation network. The Southern California coast from San Luis Obispo to San Diego has scenic coastlines and contains important environmental resources. Developing train service to help mitigate the growing highway congestion and improve air quality would help preserve these important assets.




Existing service includes eleven daily roundtrips between San Diego and Los Angeles, four between Los Angeles and Santa Barbara and one between Santa Barbara and San Luis Obispo. The San Diego and Los Angeles route is the most heavily traveled portion of the corridor. This portion of the route also serves heavy freight traffic (primarily north of Fullerton), Metrolink, and Coaster commuter services.

## Vision: On The Right Track

The intercity rail service 20-year vision is hourly service between Los Angeles and San Diego, carrying nearly six million passengers annually in under two hours, at speeds up to 110 mph. Under this vision, ridership on Metrolink and Coaster commuter rail lines has the potential to more than double.

Different service levels are proposed for each of the corridor's three segments: San Diego-Los Angeles, Los Angeles-Santa Barbara, and extended service to San Luis Obispo.

Current plans include expansion of service between San Diego and Los Angeles to fourteen daily roundtrips in the next five years and 16 daily roundtrips following implementation of the plan.

Between Los Angeles and Santa Barbara there would be five daily roundtrips in the next five years, and seven in the long term. Trip times between Los Angeles and Santa Barbara would be reduced by almost 25 percent. Service would increase north to San Luis Obispo, providing two roundtrips in the next five years (three over the longer term). San Luis Obispo trip times would be reduced by nearly 32 percent.

These cities would also see additional service from Coast Corridor trains, plus ongoing Amtrak *Coast Starlight* service, providing a total of two additional stops or trips in the near term. Table PS-1 summarizes the current density of rail traffic on specific key segments of the Corridor on a typical weekday.

## Commuter Service: Creating Synergies

### Metrolink Services

Near-term projects identified in this report would add needed capacity to allow both Metrolink and Amtrak to operate a greater number of trains more efficiently through portions of Orange, Los Angeles and Ventura Counties. They also would allow both services to expand to meet projected ridership demand. The projects include segments of additional main line track and various track realignments, flyovers and signal improvements.

### Pacific Surfliner Corridor Benefits

Direct Benefits

- Increase intercity ridership by 270%
- Add hourly service from Los Angeles to San Diego
- Add 5 new roundtrips between Los Angeles and San Diego
- Add 3 new roundtrips to Santa Barbara and 2 new roundtrips to San Luis Obispo
- Reduce schedules by as much as 1 hour

Other Benefits

- Improve commuter service
- Improve Coast Starlight service
- Enhance freight mobility

**Table PS-1**
**Typical Weekday Rail Density**

| Passenger Services | Passenger Trains | From | To | Freight trains | Total # of trains |
|---|---|---|---|---|---|
| Pacific Surfliner | 22 | San Diego | Oceanside | 4-6 | 44-46 |
| NCTD Coaster | 18 | | | | |
| Pacific Surfliner | 22 | Oceanside | Orange | 4-6 | 58-60 |
| ML Orange County | 20 | | | | |
| ML Inland Empire | 12 | | | | |
| Pacific Surfliner | 22 | Orange | Fullerton | 6-8 | 48-50 |
| ML Orange County | 20 | | | | |
| Pacific Surfliner | 22 | Fullerton | Los Angeles | 30-35 | 77-82 |
| ML Orange County | 20 | | | | |
| ML Riverside | 3 | | | | |
| Amtrak long distance | 2 | | | | |
| Pacific Surfliner | 8 | Los Angeles | Burbank Jct. | 10-12 | 72-74 |
| ML Ventura County | 18 | | | | |
| ML Antelope Valley | 2 | | | | |
| ML Burbank Airport | 12 | | | | |
| Amtrak long distance | 2 | | | | |
| Pacific Surfliner | 8 | Burbank Jct. | Burbank Airport | 10-12 | 50-52 |
| ML Ventura County | 18 | | | | |
| ML Burbank Airport | 12 | | | | |
| Amtrak long distance | 2 | | | | |
| Pacific Surfliner | 8 | Burbank Airport | Santa Barbara | 6-10 | 34-38 |
| ML Ventura County | 18 | | | | |
| Amtrak long distance | 2 | | | | |
| Pacific Surfliner | 8 | Santa Barbara | San Luis Obispo | 4-6 | 14-16 |
| Amtrak long distance | 2 | | | | |

**NOTES:** ML=Metrolink

### COASTER SERVICES

The segments of additional main line track identified in this 20-year plan are an aggressive attempt at providing the needed capacity to allow both Coaster and Amtrak to operate efficiently within San Diego County and achieve their respective long-term service plans. The projects identified in the broader vision would further assure the capacity and flexibility to meet commuters' needs for getting to work, as well as meeting demand for longer intercity trips for both business and recreation.

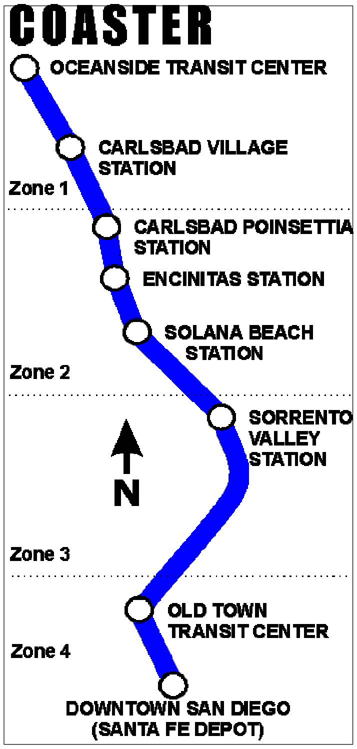



*Figure PS-2: Coaster Route*

## Freight Service: Creating Synergies

Efficient rail freight is consistently lower in cost than highway and it restrains price inflation of wholesale and consumer goods. As Southern California has grown and prospered, so has its need for foodstuffs, raw materials and manufactured goods. Many of these critical supplies come by rail. When Southern California sends its agricultural goods and industrial output to distant markets in the East and Midwest, the railroads often provide the transport.

The Ports of Long Beach and Los Angeles, the largest port complex in the country, depend heavily on BNSF and UPRR to move cargoes from Asia and the Pacific region to Midwestern and Eastern markets. The railroads also move significant tonnage of cargoes originating in Pacific Rim nations and destined for the markets of Europe in "land bridge" trains. And the port traffic is growing, with a 25-percent increase in intermodal shipments in July 2000 over July 1999.

The main lines of UPRR and BNSF heading east out of the Los Angeles Basin are helping to sustain California's prosperity and productivity by providing vital mobility and efficient distribution of its products. As a 21st-century network of intercity and commuter passenger services is built in Southern California, it must be done in such a manner that the ability of freight railroads to efficiently and reliably handle the flow of cargoes to, from and within California is not compromised and planned capacity always foresees and accommodates freight service requirements.

The Pacific Surfliner plan includes a series of staged projects that provide the potential to segregate passenger and freight trains, building on the improvements created by the Alameda Corridor Project. Foremost among these projects is the addition of third and fourth main tracks in the busy corridor segment between Redondo Junction and Fullerton Junction to provide capacity to meet future passenger and freight service goals, improve reliability and reduce delays caused by congestion.

On another key segment of the Pacific Surfliner Corridor between Taylor Yard and Santa Barbara, additional second and third main tracks and siding extensions will reduce dispatching conflicts between passenger and freight trains.

## Other Corridors

### METROLINK CORRIDORS

Projects identified by Metrolink are not all directly located on current intercity routes, but these routes are part of the regional rail network and


*Figure PS-3: Metrolink Route*

are critical to the system as a whole. In addition to regular commuter rail service, Metrolink now provides midday and late evening service on all six lines serving Los Angeles, Orange, Riverside, San Bernardino, North San Diego, and Ventura Counties. In addition, weekend service is provided on three lines: San Bernardino, Antelope Valley and Riverside.

Metrolink has several long-range planning efforts. Expansion needs were identified in Metrolink's Draft Strategic Plan 1998-2010 and then further refined in the 30-Year Expenditure Plan recently developed by Metrolink staff in response to the need to develop county expenditure plans for extension of local sales tax for transportation. Projects shown in Table PS-2 are selected Immediate need, Near-term and Vision rec-

**Table PS-2**
**Metrolink**

**Immediate Projects:**

These projects are already funded and will be implemented within three years.

| Project | Est. Cost* |
|---|---|
| Systemwide Improvements | $ 67 |
| Inland Empire Maintenance Facility | |
| Rolling Stock Acquisition | |
| Ticket Vending Machine Upgrade/Purchase | |
| GPS System | |
| San Bernardino Line | $ 41 |
| Passing Track in the I-10 Corridor | |
| Pomona to Montclair 2nd Main Track | |
| Covina & Montclair Sta. Platforms | |
| Marengo Siding Upgrades | |
| Double Track in San Bernardino County (1) | |
| Antelope Valley Line | $ 16 |
| Sun Valley Siding (1) | |
| Newhall Siding Extension | |
| Newhall Main Track Realignment | |
| Crossovers at Allen and Van Nuys | |
| Riverside Line | $ 10 |
| Pedley & Ontario Universal Crossovers | |
| Siding at Mira Loma | |
| E. Ontario & Pedley Platforms Extention | |
| Total | $ 134 |

**Near-Term Projects:**

These projects are recommended for implementation in the next ten years.

| | |
|---|---|
| Systemwide Improvements | $ 120 |
| Rolling Stock Storage Facilities | |
| Expanded/New Maintenance Facilities | |
| TVM Upgrade/Acquisition | |
| Systemwide Platform Additions | |
| San Bernardino Line | $ 9 |
| Siding West of Pomona | |

(continued)

| | |
|---|---|
| Antelope Valley Line | $ 102 |
| Los Angeles – Burbank 3rd Main Track (2) | |
| Increase Speeds in Brighton Siding | |
| Santa Clarita & Soledad Cyn Track Realignment | |
| Riverside Line | $ 5 |
| Pico Rivera & Walnut 2nd Main Track | |
| Extend Platform at Industry Station | |
| Inland Empire-Orange County Line | $ 5 |
| Siding on the Olive Subdivision | |
| Total | $241 |

**Vision Projects:**

These projects are recommended for implementation in the next twenty years.

| | |
|---|---|
| Systemwide Improvements | $ 440 |
| Rolling Stock Acquisition | |
| Rolling Stock Major Overhaul | |
| Ticket Vending Machine Upgrade/Purchase | |
| Maintenance Facilities | |
| Replace Rail/Switches at LAUS | |
| San Bernardino Line | $ 160 |
| Complete remaining double track | |
| Add six new double crossovers | |
| Install closer headway signaling | |
| Extend El Monte siding 1,200 feet | |
| Add second platforms | |
| Antelope Valley Line | $ 90 |
| Double Track 3 miles near Burbank Jcn | |
| Double Track 2.4 mi Newhall-Saugus | |
| Siding Enhancements | |
| Riverside Line | $ 60 |
| Upgrade and add 2nd main track. | |
| Total | $750 |
| **Grand Total** | **$1,125** |

(1) Addressed in the Governor's Traffic Congestion Relief plan
(2) Projects also included in Pacific Surfliner Plan
* Estimated costs presented in millions of dollars
LAUS: Los Angeles Union Station
TVM: Ticket Vending Machines

ommendations that could be implemented over the next 20 years. Projects on the Ventura County and Orange County lines are included in the Pacific Surfliner Corridor plan.

*Metrolink Systemwide Projects:* Projects identified to allow growth in the Metrolink system include rolling stock storage facilities, maintenance facilities, new rolling stock, platform extensions to expand capacity by allowing for longer trains, additional ticket vending machines (TVMs), and upgraded TVMs to serve both intercity and commuter passengers.

*San Bernardino Line:* This 56-mile line provides passenger rail service between San Bernardino and Los Angeles, with 13 stations in the two counties. Beginning in the summer of 2000, service is provided seven days per week. Projects identified to allow expansion of existing peak direction service as well as reverse-peak service include the addition of a new main line, passing tracks, and station platforms to allow ridership growth on this line of 100 percent over 20 years. The projects would also allow the addition of new intercity service between Los Angeles and Las Vegas which is anticipated in the near future. To provide for this service, Amtrak would participate in a portion of the identified improvements.

*Antelope Valley Line:* This 77-mile line provides passenger rail service between Lancaster and Los Angeles, with nine stations. In addition to weekday service, Saturday service is provided on this line. Projects identified to allow expansion of existing peak direction service as well as reverse-peak service include signal improvements, speed improvements through line changes, and the addition of new passing track to allow ridership growth of 40 percent over 20 years.

*Riverside Line:* This 59-mile line provides passenger rail service between Riverside and Los Angeles serving six stations. Beginning in the summer 2000, Saturday service is provided on this line. Over the next 20 years, freight traffic on this line is projected to grow by 50 to 100 percent. Projects identified to allow expansion of service include new track, signal improvements, and station platform extensions to allow ridership growth of 50 percent over 20 years.

*Inland Empire to Orange County Line:* This 71-mile line provides passenger rail service from the counties of San Bernardino and Riverside to Orange County and serves 11 stations. It is the nation's first suburb-to-suburb commuter rail line. Projected ridership growth on this line is over 50 percent in the next 20 years. Over the next 20 years, freight traffic on this line is projected to grow 50 to 100 percent.

#### ALAMEDA CORRIDOR EAST

The Alameda Corridor East is comprised of two main rail lines (35 miles) through the San Gabriel Valley between Los Angeles and Pomona. The project connects the ports of Los Angeles and Long Beach to the transcontinental rail network. The planned improvements focus on grade crossing upgrades and further study for freight capacity.

## New Routes: Additional Opportunities for Rail Service

*Los Angeles to Las Vegas Emerging Corridor:* New initiatives in passenger service have already begun. Daily service between Los Angeles and Las Vegas is scheduled to begin once station and capacity improvements are finished in 2002. Future plans are to expand this service and potentially add additional station stops, such as Fullerton, Riverside, San Bernardino and Barstow.

Initial improvements would be 20 miles of new second main track between Cima and Kelso. Amtrak, BNSF and UPRR are currently studying capacity improvements required to add a second and third round-trip.

*Los Angeles to Coachella Valley Emerging Corridor:* The Palm Springs area is an important new service area accessed by the Los Angeles to Coachella Valley Emerging Corridor. This heavily used freight corridor is UPRR's primary eastward route out of Southern California. UPRR is currently constructing a new second main line track to add needed freight capacity to the corridor between Banning and Palm Springs.

Three studies of intercity passenger rail service from Los Angeles to the Coachella Valley have been conducted in the last decade. The "Coachella Valley Passenger Rail Feasibility Study," dated February 1999, is the most recent study. This study, conducted by the Coachella Valley Association of Governments, examines the feasibility of providing passenger rail service to the Coachella Valley from Los Angeles. Two intercity passenger trains per day operated by Amtrak as a three-year demonstration are recommended by the study.

In the Immediate time frame, efforts would be made to achieve one roundtrip per day from Los Angeles to the Coachella Valley with a travel time of less than three hours. Potential station stops would include Los Angeles Union Station (LAUS), Fullerton Transportation Center, Riverside-Downtown, Palm Springs and the Amtrak Indio station. This service would potentially require additional tracks between Colton and Indio.

# Existing Pacific Surfliner Corridor Conditions

The Pacific Surfliner Corridor is a 351-mile-long route over joint freight/commuter rail trackage from San Luis Obispo to San Diego. The Pacific Surfliner Corridor encompasses four ownership entities: San Diego Northern Railway (SDNR), SCRRA, UPRR and BNSF.

The Pacific Surfliner and Coast Corridors overlap between San Luis Obispo and Los Angeles. The existing conditions for the overlapping portion of the corridors between San Luis Obispo and Goleta are described in the Coast Corridor section of this report. The existing conditions of the Goleta to San Diego segment of the Pacific Surfliner Corridor are discussed below.

The Pacific Surfliner Corridor is comprised of seven railroad subdivisions between Goleta and San Diego. These subdivisions are the SDNR, SCRRA Orange Subdivision, BNSF San Bernardino Subdivision, SCRRA River Subdivision, SCRRA Valley Subdivision, SCRRA Ventura Subdivision and UPRR Santa Barbara Subdivision. The SDNR is 60.10 route miles long from San Diego (MP 267.50) to the Orange County Line (MP 207.40). The SCRRA Orange Subdivision is 42.00 route miles long from the Orange County Line (MP 207.40) to Fullerton (MP 165.40). The BNSF San Bernardino Subdivision runs 22.20 route miles from Fullerton (MP 165.40) to Redondo Junction (MP 143.20). The SCRRA River Subdivision is 7.75 route miles long from Redondo Junction (MP 143.20) to Taylor Yard (MP 3.75). The SCRRA Valley Subdivision is 7.63 route miles long from Taylor Yard (MP 3.75) to Burbank Junction (MP 11.38). The SCRRA Ventura Subdivision runs 35.70 route miles from Burbank Junction (MP 462.20) to CP Las Posas (MP 426.50). The UPRR Santa Barbara Subdivision runs from Moorpark/Los Posas (MP 423.10) to Goleta (MP 357.70), for 65.40 route miles.

The existing conditions of the Pacific Surfliner Corridor infrastructure are briefly described below. A more detailed description of the existing conditions can be found in Appendix C – Pacific Surfliner Corridor Existing Conditions Report.

#### DESCRIPTION OF SUBDIVISIONS

The SDNR from San Diego to the Orange County Line is primarily single track. Portions of the line are either designated double track or as siding. These sidings are located at San Onofre (MP 209.20 – MP 210.20), Flores (MP 218.10 – 219.00), Stuart (MP 220.80 – MP 222.80), Fallbrook Junction (MP 223.60 – MP 225.30), Oceanside (MP 225.90 – MP 227.20), Ponto (MP 231.40 – MP 234.50), Solana Beach (MP 241.10 – MP 242.20), Del Mar (MP 243.30 – MP 243.90) and Sorrento Valley (MP 248.80 – MP 249.80). The SDNR has 8.30 miles of double track in two segments. These segments are from Miramar (MP 252.90) to Elvira (MP 257.90) and from Old Town (MP 264.10) to San Diego (MP 267.50). San Diego County is roughly 35 percent double track and 65 percent single track.

The entire route is controlled by a CTC system. In order to allow train movements in excess of 79 mph in accordance with FRA regulations, an intermittent inductive automatic train stop system (ATS) is installed on a portion of this line. This system acts as a reminder to the locomotive engineer when passing a signal that displays a signal more restrictive than clear. If the locomotive engineer does not acknowledge the ATS warning, the train's brakes are automatically applied. (This ATS system, however, is not installed on the sidings.) The main line track structure is 112-lb., 115-lb. and 136-lb. CWR on concrete and timber ties.

The SCRRA Orange Subdivision, from the Orange County Line to Fullerton Junction, is double track for 27.00 miles: from Fullerton Junction (MP 165.40) to CP La Veta (MP 173.20) in Orange and from CP Lincoln (MP 174.70) in Santa Ana to CP Avery (MP 193.90) in Laguna Niguel. (Double tracking of the 1.5

miles between CP LaVeta and CP Lincoln is funded and will be completed in the near future). The remaining 15.00 miles of this section of the corridor is single track, with one passing siding at San Juan Capistrano (MP 198.00 – MP 199.90). The SCRRA Orange Subdivision has an ATS signal system, similar to the one installed on the SDNR. The Orange Subdivision is 115-lb. and 119-lb. CWR on timber and concrete ties. Orange County is 65 percent double track and 35 percent single track.

The BNSF San Bernardino Subdivision from Fullerton Junction to Redondo Junction is double track, except for four miles from MP 144.70 near Hobart Tower to MP 148.70 near Bandini, where it is triple track. A CTC signal system is used on this subdivision. The track structure on the San Bernardino Subdivision is entirely 136-lb. CWR on timber and concrete ties.

The SCRRA River Subdivision from Redondo Junction to LAUS is double track, except for a 2.20-mile section with four tracks from LAUS (MP 0.00) to Taylor Yard. The signal system is CTC from Redondo Junction to LAUS. The entire SCRRA River Subdivision track structure is 136 lb. CWR on timber and concrete ties.

The SCRRA Valley Subdivision from Taylor Yard to Burbank Junction is entirely double track. The SCRRA Valley Subdivision signal system is CTC. The track structure is 136-lb. CWR with timber ties.

The SCRRA Ventura Subdivision from Moorpark to Burbank Junction is single track, with four passing sidings from Moorpark to CP Raymer (MP 453.10) in Van Nuys and double track from CP Raymer in Van Nuys to Burbank Junction. The four sidings are located at Moorpark (MP 426.50 - MP 427.50), Strathearn (MP 431.10 - MP 432.90), Hasson (MP 440.30 - MP 440.80) and Chatsworth (MP 445.20 - MP 446.80). The signal system is CTC from Moorpark to Burbank Junction. The SCRRA Ventura Subdivision track structure consists of 119-lb., 132-lb. and 136-lb CWR on timber ties.

The UPRR Santa Barbara Subdivision's track structure from Goleta to Moorpark is single track with five passing sidings. There are two main tracks within Santa Barbara (MP 364.98 - MP 368.62) and four sidings at Seacliff (MP 385.25 - MP 386.32), Ventura (MP 394.76 - MP 395.93), Oxnard (MP 404.22 - 405.48) and Camarillo (MP 412.50 - MP 414.65). A new CTC signal system is being installed from Moorpark to Ellwood, north of Goleta. The subdivision's track structure is 90-lb., 113-lb., 115-lb., 119-lb., 132-lb., 133-lb. and 136-lb. CWR on timber ties.

**STATION FACILITIES**

There are 22 Amtrak passenger train stations on the Pacific Surfliner Corridor between Goleta and San Diego. Parking is provided at all Amtrak stations. The details of joint usage, staffing and ownership are listed in Table PS-3.

**Table PS-3**
**Station Facilities**

| Station | Users | Staffed | Station Ownership |
|---|---|---|---|
| San Luis Obispo | Amtrak | Yes | UPRR |
| Guadalupe | Amtrak | No | UPRR |
| Lompoc-Surf | Amtrak | No | UPRR |
| Goleta | Amtrak | No | UPRR |
| Santa Barbara | Amtrak | Yes | City of Santa Barbara |
| Carpinteria | SCRRA, Amtrak | No | State of California |
| Ventura | Amtrak | No | City of Ventura |
| Oxnard | SCRRA/Amtrak | Yes | City of Oxnard |
| Camarillo | SCRRA/Amtrak | No | City of Camarillo |
| Moorpark | SCRRA/Amtrak | No | City of Moorpark |
| Simi Valley | SCRRA/Amtrak | No | City of Simi Valley |
| Chatsworth | SCRRA/Amtrak | No | City of Los Angeles |

**Table PS-3 (continued)**
**Station Facilities**

| Station | Users | Staffed | Station Ownership |
|---|---|---|---|
| Van Nuys | SCRRA/Amtrak | Yes | State of California |
| Burbank Airport | SCRRA/Amtrak | No | State of California |
| Glendale | SCRRA/Amtrak | No | City of Glendale |
| Los Angeles (LAUS) | SCRRA/Amtrak | Yes | Catellus Development Corp. |
| Fullerton | SCRRA/Amtrak | Yes | City of Fullerton |
| Anaheim | SCRRA/Amtrak | Yes | City of Anaheim |
| Santa Ana | SCRRA/Amtrak | Yes | City of Santa Ana |
| Irvine | SCRRA/Amtrak | Yes | City of Irvine |
| San Juan Capistrano | SCRRA/Amtrak | Yes | Manna Stations |
| San Clemente (Pier) | Amtrak | No | Orange County Transportation Agency |
| Oceanside | SCRRA/Coaster/Amtrak | Yes | NCTD |
| Solana Beach | Coaster/Amtrak | Yes | NCTD |
| San Diego | Coaster/Amtrak | Yes | Catellus Development Corp. |

### LAYOVER AND MAINTENANCE FACILITIES

Amtrak maintenance facilities along the Pacific Surfliner Corridor are located in Los Angeles (8$^{th}$ Street Yard) and Goleta. The Los Angeles 8$^{th}$ Street Yard is Amtrak's major maintenance facility in Southern California. The Goleta facility provides train washing, locomotive fueling and minor emergency repairs.

The Amtrak layover facilities for the Pacific Surfliner trains are located at San Diego Station, Los Angeles 8$^{th}$ Street Yard and Goleta.

Commuter railroad maintenance facilities are located at Stuart Mesa (NCTD and SCRRA ) and Los Angeles Taylor Yard (SCRRA).

## The Southern California Plan

Specific objectives for the Pacific Surfliner Corridor include increasing frequency to meet growing passenger demand, reducing travel times and improving operational reliability. To meet its service goals, the Pacific Surfliner Corridor Task Force developed an integrated capital improvement program that identifies Immediate, Near-term and Vision improvements and projects.

Forty-one percent of this 128-mile segment of the Pacific Surfliner corridor, from Los Angeles to San Diego, consists of single track, with the remainder being double track. Providing additional capacity is a top priority that would benefit all rail services in this corridor by improving travel time and operational reliability.

Southern California's rail network is an extremely congested and critically important component of the regional transportation system. Unprecedented growth in passenger trips between cities, increased commuter trips to employment centers and an explosion of international trade through Los Angeles and Long Beach area ports has meant more trains and more gridlock. The rail network's previous excess capacity, which allowed the creation of commuter operations and expansion of intercity rail in the early 1990s, has been consumed. Additional service cannot be implemented unless capacity is increased.

New investments in track and signals require a system-wide approach to ensure that ridership objectives are achieved. Freight mobility projects, such as the Alameda Corridor and Alameda Corridor East, are being integrated into the planning process to ensure the continued economic prosperity of the region.

Relieving congestion on shared (passenger and freight) corridors is a critical priority if Near-term goals of additional service, increased operational reliability, and reduced trip times are to be met. Working together in partnership with the communities, these goals can be achieved, while also protecting the important environmental resources along the coast.

The individual improvement projects needed for the Pacific Surfliner Corridor for the three time frames – Immediate, Near-term and Vision – are listed in Tables PS-5 through PS-7, respectively, along with their estimated costs. A narrative description of each project and location maps are provided following the tables. The overall project costs for the three time frames are summarized in Table PS-4.

The Pacific Surfliner and Coast Corridors overlap between San Luis Obispo and Los Angeles. Projects between San Luis Obispo and Los Angeles are described and the costs estimated in this Pacific Surfliner Corridor section of the report.

**Table PS-4**
**Pacific Surfliner Corridor 2000 – 2020 Summary Projects List**

| Description | Project Cost (in millions, based on year 2000 dollars) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Project** | **Project Devel- (PE, EIR/S, CM)** | **Right-of-Way** | **Track-work/ Struc-tures** | **Stations** | **Signal/ Systems** | **Grade Cross-ings** | **Roll-ing Stock** | **Total Cost** |
| Immediate Projects Subtotal | 129.80 | 16.34 | 697.53 | 34.94 | 66.74 | 6.57 | 26.70 | **978.62** |
| Near-Term Projects Subtotal | 95.74 | 13.76 | 351.05 | 12.05 | 253.18 | 23.11 | 1.41 | **750.30** |
| Vision Projects Subtotal | 318.65 | 73.80 | 2,130.26 | 4.18 | 30.00 | 4.47 | 0.00 | **2,561.36** |
| **Pacific Surfliner Corridor Total** | **544.19** | **103.9** | **3,178.84** | **51.17** | **349.92** | **34.15** | **28.11** | **4,290.28** |

**NOTES:** PE: Preliminary Engineering; EIR/S: Environmental Impact Report/Statement; CM: Construction Management

### IMMEDIATE PERIOD

The Immediate projects described below and listed in Table PS-5 are projects identified for implementation on the Pacific Surfliner Corridor within the next three years.

**Table PS-5**
**Pacific Surfliner Corridor Immediate Projects List**

| Description | | Project Cost (in millions, based on year 2000 dollars) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Project No. | Project Name | Project Devel-opment (PE, EIR/S, CM) | Right-of-Way | Track-work/ Structures | Stations | Signal/ Systems | Grade Crossings | Rolling Stock | **Total Cost** |
| PS-01 | Summerland Siding | 1.34 | 0.00 | 3.49 | 0.00 | 3.43 | 1.77 | 0.00 | **10.03** |
| PS-02 | Carpinteria Siding | 1.03 | 0.00 | 3.61 | 0.00 | 3.09 | 0.00 | 0.00 | **7.73** |
| PS-03 | Burbank Junction Track Realignment | 0.39 | 0.00 | 1.19 | 2.52 | 0.24 | 0.00 | 0.00 | **4.34** |
| PS-04 | Los Angeles to Burbank Third Main Track | 13.31 | 0.00 | 81.03 | 0.00 | 4.13 | 1.43 | 0.00 | **99.90** |
| PS-05 | Union Station Run-Through Tracks | 42.68 | 15.00 | 273.58 | 0.00 | 4.12 | 0.00 | 0.00 | **335.38** |

## Table PS-5 (continued)
## Pacific Surfliner Corridor Immediate Projects List

| Description | | Project Cost (in millions, based on year 2000 dollars) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Project No. | Project Name | Project Devel-opment (PE, EIR/S, CM) | Right-of-Way | Track-work/ Structures | Stations | Signal/ Systems | Grade Crossings | Rolling Stock | **Total Cost** |
| PS-06 | Los Angeles to Fullerton Junction Third Main Track and | (This is a three-phase project divided into projects PS-07A, PS-07B, and PS-07C. Detailed descriptions of these projects are listed below.) | | | | | | | |
| *PS-06A* | *Commerce to DT Junction Third Main Track* | *3.61* | *0.00* | *23.22* | *0.00* | *3.17* | *0.00* | *0.00* | ***30.00*** |
| *PS-06B* | *DT Junction to La Mirada Third Main Track* | *3.89* | *0.00* | *18.21* | *0.00* | *7.10* | *1.40* | *0.00* | ***30.60*** |
| *PS-06C* | *La Mirada to Basta Third Main Track* | *3.82* | *0.00* | *17.88* | *0.00* | *6.97* | *0.00* | *0.00* | ***28.67*** |
| PS-07 | Basta to Fullerton Junction Fourth Main Track | 9.34 | 0.00 | 58.97 | 3.81 | 1.84 | 0.00 | 0.00 | **73.96** |
| PS-08 | Santa Ana Station Improvements | 0.64 | 0.00 | 0.00 | 4.18 | 0.00 | 0.00 | 0.00 | **4.82** |
| PS-09 | Irvine Station Improvements | 1.60 | 0.00 | 3.13 | 4.18 | 3.10 | 0.00 | 0.00 | **12.01** |
| PS-10 | CP San Onofre to CP Pulgas Second Main Track | 3.72 | 0.00 | 17.31 | 0.00 | 6.55 | 0.34 | 0.00 | **27.92** |
| PS-11 | CP Flores to CP O'Neil Second Main Track | 0.82 | 0.00 | 3.89 | 0.00 | 1.15 | 0.29 | 0.00 | **6.15** |
| PS-12 | CP Puller to CP West Brook Second Main Track | 4.06 | 0.00 | 20.20 | 0.00 | 6.14 | 0.00 | 0.00 | **30.40** |
| PS-13 | CP East Brook to CP Shell Second Main Track | 1.39 | 0.00 | 8.22 | 0.00 | 0.53 | 0.30 | 0.00 | **10.44** |
| PS-14 | Oceanside Station Improvements | 1.74 | 0.00 | 2.11 | 4.23 | 4.62 | 0.34 | 0.00 | **13.04** |
| PS-15 | CP Ponto to Encinitas Passing Siding Second Main Track | 4.04 | 0.00 | 22.92 | 0.00 | 2.30 | 0.00 | 0.00 | **29.26** |
| PS-16 | Encinitas Passing Siding | 0.00 | 0.00 | 2.50 | 0.00 | 0.5 | 0.00 | 0.00 | **3.00** |
| PS-17 | Encinitas Passing Siding to Solana Beach Second Main Track | 9.77 | 0.00 | 59.79 | 0.00 | 2.27 | 0.55 | 0.00 | **72.38** |
| PS-18 | Solana Beach to Del Mar Second Main Track | 2.40 | 0.00 | 15.18 | 0.00 | 0.37 | 0.15 | 0.00 | **18.10** |
| PS-19A | San Clemente Alternatives Analysis | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **1.00** |
| PS-19B | Del Mar Alternatives Analysis | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **1.00** |
| PS-20A | Sorrento to Miramar Curve Realignment and Second Track | 4.34 | 1.34 | 24.88 | 0.00 | 1.15 | 0.00 | 0.00 | **31.71** |
| PS-20B | Miramar Tunnel Study | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **2.00** |
| PS-21 | CP Elvira to False Bay Passing Siding Second Main Track | 3.17 | 0.00 | 16.64 | 0.00 | 3.97 | 0.00 | 0.00 | **23.78** |

**Table PS-5 (continued)**
**Pacific Surfliner Corridor Immediate Projects List**

| Description | | Project Cost (in millions, based on year 2000 dollars) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Project No. | Project Name | Project Devel-opment (PE, EIR/S, CM) | Right-of-Way | Track-work/ Structures | Stations | Signal/ Systems | Grade Crossings | Rolling Stock | **Total Cost** |
| PS-22 | San Diego or National City Layover Facility | 2.42 | 0.00 | 19.58 | 0.00 | 0.00 | 0.00 | 0.00 | **22.00** |
| PS-23 | San Diego Depot De-velopment | 1.65 | 0.00 | 0.00 | 13.35 | 0.00 | 0.00 | 0.00 | **15.00** |
| PS-24 | Rolling Stock | 3.30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 26.70 | **30.00** |
| PS-25 | Passenger Service Enhancements and New Route Studies | 1.33 | 0.00 | 0.00 | 2.67 | 0.00 | 0.00 | 0.00 | **4.00** |
| **Subtotal** | | **129.80** | **16.34** | **697.53** | **34.94** | **66.74** | **6.57** | **26.70** | **978.62** |

In addition to the listed projects, there are five projects either under construction or scheduled to start construction in early 2001. These projects are described below:

<ins>El Toro Siding MP 186.00</ins>: This project will extend existing siding 0.91 mile (4,830 feet) north, including various track realignments. It will also include various switch relocations and signal modifications. Work is scheduled for construction winter 2001.

<ins>CP Lincoln to CP La Veta Second ML</ins>: The design effort is 60 percent complete. This project would include the construction of 1.50 miles of second main line from Palmera Street, MP 173.20, to 17th Street, MP 174.70, in the city of Orange. As of January 2001, this project was in the environmental review process.

<ins>Hasson Siding</ins>: The design effort is near completion to extend the existing siding 1.30 miles north, from MP 440.3 to MP 439.0, for a total siding length of 1.50 miles. Construction is slated for Spring 2001.

<ins>Chatsworth Siding</ins>: This project will extend the existing siding 0.60 mile north, from MP 445.20 to MP 444.60, for a total siding length of 2.20 miles. The design effort is near completion and construction is slated in Spring 2001.

<ins>Laguna Niguel/Mission Viejo Station</ins>: Station platform and parking facilities are currently under design; no track modifications are planned.

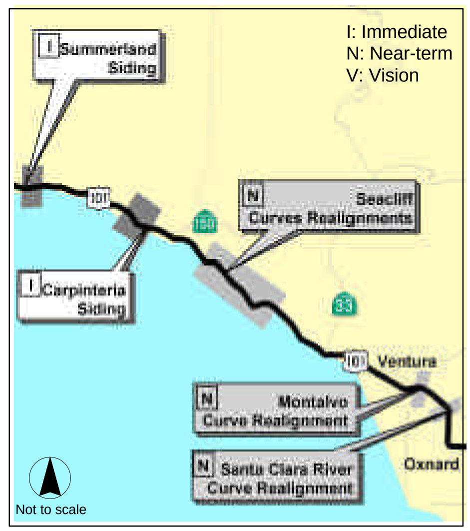



***Figure PS-4: Summerland to Oxnard***

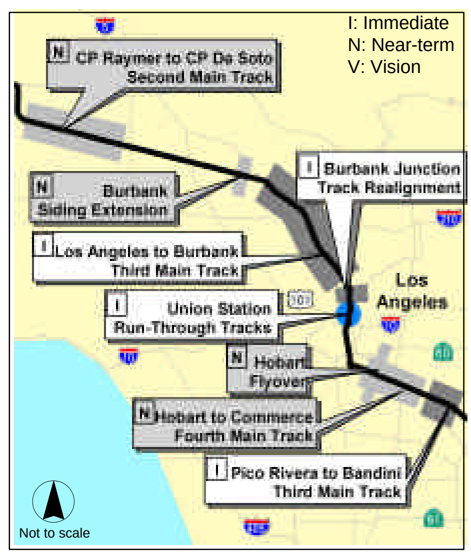



***Figure PS-5: Chatsworth to Pico Rivera***

<ins>New Sidings in Santa Barbara County: (Projects PS-01 and PS-02)</ins>: These two projects are similar in scope and purpose: provide alternative meeting points on the single track south of Santa Barbara. With the need to provide maximum service with minimum investment in new equipment, strategically placed sidings would provide an "escape" valve to permit railroad dispatchers to react

quickly to minor delays and maintain a high level of reliability.

<u>Summerland Siding (PS-01)</u>: This infrastructure improvement, located seven miles south of Santa Barbara at Summerland, is a 0.80-mile new siding with new CTC between Summerland and Carpinteria, from MP 373.20 to MP 374.00. New No. 20 turnouts would be installed. This new siding would provide additional capacity, reduce trip times, and improve operational reliability for both freight and passenger traffic.

<u>Carpinteria Siding (PS-02)</u>: This project is located nine miles south of Santa Barbara. This infrastructure improvement is a 1.70-mile new siding with new CTC at Carpinteria Station from MP 376.80 to MP 378.50. New No. 20 turnouts would be installed. This new siding would provide additional capacity, reduce trip times, and improve operational reliability for both freight and passenger traffic.

<u>Burbank Junction Track Realignment (PS-03)</u>: Burbank Junction is the merge point between the Antelope Valley line and Metrolink's Ventura Subdivision, a line served by long-distance trains and the Pacific Surfliners. Through this busy junction, the primary route over Metrolink's Ventura Subdivision diverges through low-speed turnouts to a reduced-speed curve to the west, while Antelope Valley trains continue on a straight line through the junction. The installation of new high-speed switches and a modest amount of track realignment on the curve would permit an upgrade of the track and subsequent higher track speeds (up to 90 mph) through the junction.

This project would decrease travel time.

<u>Los Angeles to Burbank Third Main Track (PS-04)</u>: The eight-mile route between the east bank of the Los Angeles River and Burbank presents operating conflicts for both passenger and freight trains. Located along this segment of Metrolink's Valley Subdivision is SCRRA's Taylor Yard, a maintenance and storage facility, and UPRR's Taylor Yard, their prime locomotive maintenance facility in the Los Angeles River basin. Train movements into and out of these facilities, combined with freight and local trains to Burbank and points north on UPRR's Coast Line, as well as freights using Metrolink's Antelope Valley line for points north of Palmdale, strain the capacity of a two-track railroad. This major infrastructure project would construct a third main track, 8.40 miles in length, between Los Angeles and Burbank, from MP 3.00 to MP 11.40. This project would also realign the crossovers at CP Metro, between MP 3.00 and MP 3.50 (the entrance to the Metrolink facility), to allow construction of the third track. This track would be constructed to FRA Class 5 standards for a maximum speed for passenger trains of 90 mph.

The benefits of this project would be improved operational reliability and increased capacity.


**Figure PS-6: Whittier to San Clemente**

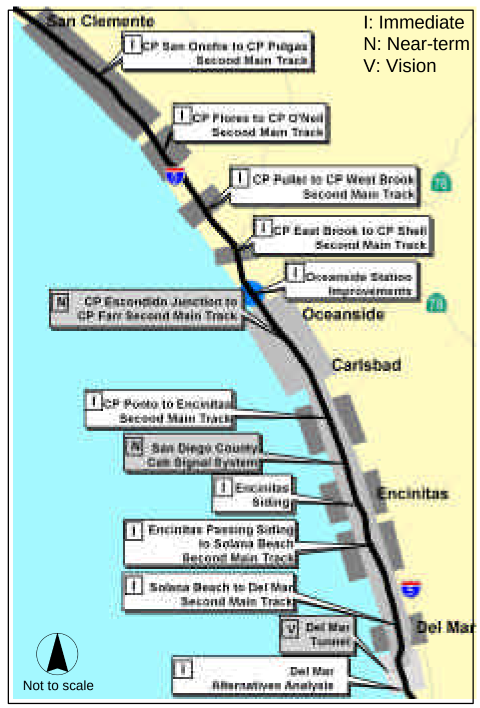
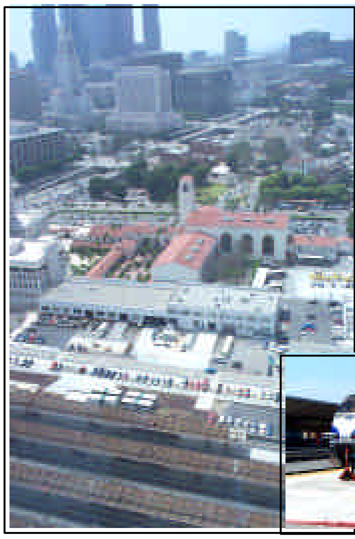



**Figure PS-7: San Clemente to Del Mar**



*Union Station Run-Through Tracks (PS-05):* Today's LAUS serves far more passenger trains than at any point in its 70-plus years of existence. It also serves a more varied mix of trains, including Pacific Surfliner Corridor trains, Amtrak long-distance trains and local commuter trains moving north, south and east of the station.

When the terminal was constructed in the late 1930s, its primary function was to accommodate long-distance passenger trains. These trains required long loading times and time-consuming servicing within the station to support amenities such as baggage, mail and sleeping car/dining car operations. Schedules were designed in such a way that sufficient time was permitted to move locomotives from one end of the train to the other as part of the operation.

Today's LAUS requires a rethinking about not only how trains are serviced but how they move in and out of this busy terminal. At the present time, all trains are processed through the throat of Mission Interlocking, the switching complex on the East Bank of the Los Angeles River. The physical layout of Mission Interlocking places Metrolink service to San Bernardino and Riverside into direct conflict with Amtrak and Metrolink service from Orange County and San Diego.

This project proposes the construction of two new half-mile-long connecting tracks from SCRRA's River Subdivision at First Street to the west side of the Union Station track complex, connecting to station tracks three through six via an elevated structure that bridges U.S. Highway 101.

This project would generate a number of benefits:

- New commuter and regional "one-seat rides" that link points north of Los Angeles with points east and south of Los Angeles would be developed. Experience in other major urban areas with such new through services indicates that the very scheduling of such services, whether market-based or not, helps develop new commuter patterns.
- Travel time would be reduced for Pacific Surfliner service because the new connecting tracks would route trains in and out of LAUS faster and eliminate conflicts at Mission Interlocking. This would eliminate the current requirement to reverse directional movement of the train.
- Eliminating the need for Metrolink crews to switch trains would bring about crew economies and permit better equipment utilization through the reduction in "dead" time in train storage yards. While "through" schedules have not yet been developed, preliminary simulation of through-running indicates that improved equipment utilization could possibly permit new schedule initiatives without the need for additional equipment investments.


***Figure PS-8: Del Mar to National City***

Projects PS-06 and PS-07 (Redondo Junction-Fullerton Passenger/Freight Corridor): These projects involve what is one of the nation's busiest mixed-use rail corridors, used by Amtrak Pacific Surfliner service, Amtrak long-distance service to Texas/Chicago and New Orleans/Orlando, Metrolink Orange County service to Oceanside and BNSF's growing merchandise and intermodal service to Los Angeles proper and Los Angeles Harbor at Long Beach. The work at Redondo Junction, where the tracks leading to LAUS are carried over BNSF's and UPRR's connecting tracks to the Alameda Corridor (freight) to Long Beach, represents a step toward reconciling passenger and freight conflicts in the Los Angeles Basin.

Continuing increases in demand for track space by both passenger and freight movements require a holistic solution to dealing with Immediate, Near-term and Vision regional service needs along the busy stretch of tracks between Redondo Junction and Fullerton.

The end result, as outlined in these major projects, would be a contiguous series of infrastructure investments. They would be engineered as a single project and executed in geographically logical stages, to produce increasingly visible returns in reduced trip time, operational reliability and the capacity to keep pace with projected traffic levels.

The Immediate projects would primarily concentrate on establishing a continuous three-track corridor between Redondo Junction (Hobart Yard) and Fullerton Junction. All the stakeholders in this work, however, recognize that the Near-term goal must be a much more comprehensive separation of freight and passenger traffic at the western end of the corridor. That segregation of service is addressed in Near-term projects PS-38 and PS-39 that would construct a flyover of the UPRR San Pedro Branch crossing at Hobart Yard and extend the fourth track through the cities of Vernon and Commerce.

*Los Angeles to Fullerton Junction Third Main Track (PS-06) and Basta to Fullerton Junction Fourth Main Track (PS-07):* To ease increasing congestion between freight and passenger service, a new third main line track, and ultimately a fourth, is proposed between Los Angeles and Fullerton Junction. Freight trains would use the east main line track while passenger trains would use the west track. The middle track would be shared by both freight and passenger trains. These improvements consist of Projects Nos. PS-06A, PS-06B, PS-06C and PS-07.

*Commerce to DT Junction Third Main Track (PS-06A):* This major infrastructure project would construct a third main track, four miles long, between Commerce and DT Junction. The benefits of this project would be improved operational reliability, reduced trip times and increased capacity.

*DT Junction to La Mirada Third Main Track (PS-6B):* This major infrastructure project is located seven miles north of Fullerton. This project would construct a third main track, 5.60 miles in length, between DT Junction and La Mirada, from MP 152.10 to MP 157.70. The northern main track would connect to the north siding through Norwalk Station. New bridges would be constructed at four locations and seven new grade crossings would be installed. The benefits of this project would be improved operational reliability and increased capacity.

*La Mirada to Basta Third Main Track (PS-06C):* This major infrastructure project, located two miles north of Fullerton, would construct a third main track, 5.30 miles in length, on the south side of the BNSF main line tracks between La Mirada and Basta, from MP 157.70 to MP 163.00. This track would be constructed to FRA Class 5 standards. Two new bridges and a street undercrossing would also be constructed. The benefits of this project would be improved operational reliability and increased capacity.

*Basta to Fullerton Junction Fourth Main Track (PS-07):* This major infrastructure project would construct a 2.50-mile-long fourth main track between Basta (MP 163.00) and Fullerton Junction (MP 165.50). The two south main tracks would directly connect to the two main tracks of the San Diego Subdivision. The fourth main track would be constructed to FRA Class 5 standards. An additional south passenger platform would be required at Fullerton Station. The benefits of this project would be improved operational reliability, reduced trip times and increased capacity.

*Santa Ana Station Improvements (PS-08):* To board most Los Angeles-bound trains, passengers must cross the San Diego-bound track and board on a narrow platform between the two tracks. Should another train be approaching the station, that other train must wait until the first one has left.

A new side platform, adjacent to the east track through Santa Ana Station, would be constructed to improve passenger convenience and safety. A pedestrian overpass would also be constructed.

This improvement would help insure on-time reliability and enhance passenger safety.

*Irvine Station Improvements (PS-09):* Station improvements would be undertaken at Irvine to construct an auxiliary siding and platform to provide a short-term storage location for trains that terminate or originate at Irvine. While auxiliary platforms do exist at Irvine, they are not designed in such a way as to permit the safe and simultaneous loading or unloading of two trains.

This new 0.50-mile-long holding track and crossover would be constructed to the east side of the station, between MP 184.50 (CP Tinkham) and MP 185.00.

These track and platform improvements at the Irvine Station would contribute to operational reliability and flexibility and permit the scheduling of additional service on either the Metrolink Orange County line or the Metrolink Inland Empire line without conflicting with Pacific Surfliner service. The benefits of this project would be improved operational reliability and increased capacity.

*Added Second Track Projects, San Diego County (Projects PS-10, PS-11, PS-12, PS-13):* As Amtrak's second-busiest corridor, the Pacific Surfliner Corridor offers frequencies second only to the Boston-New York-Washington Northeast Corridor. Amtrak recognizes that a trade-off can exist between the frequency of trains and reliability, when operating on a single-track line. Its present schedules, therefore, allow for judiciously placed meeting times at sidings to make sure that the train in the opposite direction has reached the double-track section or the siding track within a reasonable time envelope.

The development of future schedule frequencies, however, requires a concurrent increase in line capacity through the addition of more second track. The plan for the Pacific Surfliner Corridor stipulates the construction of four segments of second track within San Diego County, north of Oceanside, as a first step towards increasing frequencies.

Detailed below are the four San Diego segments between the Orange County Line and Oceanside.

> *CP San Onofre to CP Pulgas Second Main Track (PS-10):* This improvement project, located 8.24 miles north of Oceanside, is an ongoing Caltrans project. This project would construct a second main track between CP San Onofre and CP Pulgas, 7.90 miles long, from MP 210.20 to MP 218.10. This track would be constructed on the geographical west side, to FRA Class 5 standards. Two No. 20 turnouts would be removed. Five new bridges would also be constructed, at MP 215.30, MP 216.90, MP 217.00, MP 217.32 and MP 218.00. The benefits of this project would be improved reliability, reduced trip time, and increased capacity.
>
> *CP Flores to CP O'Neil Second Main Track (PS-11):* This improvement project, located 5.60 miles north of Oceanside, would construct a second main track between CP Flores and CP O'Neil, 1.80 miles long, from MP 219.00 to MP 220.80. This track would be constructed to FRA Class 5 standards. Two existing No. 20 turnouts would be removed. The benefits of this project would be improved operational reliability, reduced trip times and increased capacity.
>
> *CP Puller to CP West Brook Second Main Track (PS-12):* This improvement project is located 2.76 miles north of Oceanside. This project would construct a second main track, 0.80 mile long, between CP Puller (MP 222.80) to CP West Brook (MP 223.60). Furthermore, this project would reconstruct and realign the Fallbrook Passing track from MP 223.6 to MP 225.3, a total of 1.7 miles. This track would be constructed to FRA Class 5 standards. Two existing No. 10 turnouts would be removed. Bridge No. 223.0 would be replaced with a new, phased, double-track bridge. Phase one would include construction of a new pre-stressed concrete ballast deck on a concrete-pile-and-cap structure adjacent and parallel to the existing main line. Once in place and traffic diverted to the new structure, the existing bridge would be retired and removed. Phase two would include construction of a new pre-stressed concrete ballast deck on a concrete-pile-with-cap structure and related track construction to join the Stuart Mesa and Fallbrook Sidings. The resultant double track segment would be 4.5 miles in length. The benefits of this project would be improved operational reliability, reduced trip times and increased capacity. This improvement work corresponds with the NCTD Santa Margarita River Bridge and Second Track Project Study Report (August 2000).

*CP East Brook to CP Shell Second Main Track (PS-13):* This improvement project, which is located 0.46 mile north of Oceanside, would construct a second main track between CP East Brook and CP Shell, 0.60 mile long, from MP 225.30 to MP 225.90. The bridge across the San Luis Rey River would be double-tracked. The replacement bridge could be realigned to reduce the degree of track curvature. This second track would be constructed to FRA Class 5 standards. A new 704-foot-long double-track concrete bridge would be constructed at MP 225.40. Two existing No. 20 turnouts would be removed. The benefits of this project would improved operational reliability, reduced trip times and increased capacity.

*Oceanside Station Improvements (PS-14):* At Oceanside Station (MP 226.40), a new 0.40-mile-long holding track and crossovers would be constructed to allow Metrolink and Coaster trains to clear the main line track while turning back. This track would be constructed, on the geographic west side of the existing trackage, to FRA Class 5 standards. One No. 10 turnout and one No. 10 crossover would be installed. The benefits of this project would be improved operational reliability and increased capacity.

*CP Ponto to Encinitas Passing Siding Second Main Track (PS-15):* This improvement project is located nine miles south of Oceanside and would be constructed in two phases. Phase one would construct a 0.7-mile-long second main track from CP Ponto, MP 234.50, crossing the Batiquitos Lagoon at MP 235.20. Phase two, from MP 235.20 to MP 238.00, would construct 2.8 miles of second main track between the Batiquitos Lagoon and MP 238.00, passing through Leucadia and the Encinitas station. This new track would be constructed to FRA Class 5 standards. An existing No. 20 turnout at MP 234.50 would be removed. A pedestrian bridge and grade crossing with signals at MP 236.50 would also be constructed. New grade crossings with signals would be constructed at D Street (MP 237.90) and E Street (MP 237.95) in Encinitas.

*Encinitas Passing Track (PS-16):* This infrastructure improvement would include approximately 1.7 miles of new siding in Encinitas from MP 238.00 to MP 239.70. This siding would be constructed to FRA Class 5 standards.

*Encinitas Passing Track to Solana Beach Second Main Track (PS-17):* This improvement project, which is located north of Del Mar, would construct a 1.40-mile-long second main track between the Encinitas Passing Siding and Solana Beach, from MP 239.70 to MP 241.10. This track would be constructed to FRA Class 5 standards. One No. 20 turnout would be removed. A 0.60-mile-long concrete viaduct would also be constructed. A new rail/highway grade crossing with flashing light signals and short-arm gates would be constructed at Chesterfield Drive, MP 239.80.

*Solana Beach to Del Mar Second Main Track (PS-18):* This improvement project, which is located 16 miles south of Oceanside, would construct a 1.10-mile-long second main track between Solana Beach and Del Mar, from MP 242.20 to MP 243.30. This track would be constructed to FRA Class 5 standards for a maximum speed for passenger trains of 90 mph. The existing turnout at CP Crosby would be removed. Bridge No. 243 across the San Dieguito River would be replaced with a 0.20-mile-long, phased, double-track bridge. Phase one construction would include a new concrete ballast deck on a steel pile structure adjacent and parallel to the existing main line. Once in place and traffic is diverted to the new structure, the existing bridge would be removed. Phase two of construction consists of a new concrete ballast deck on a steel pile structure and related track construction to join Solana Beach and Del Mar Sidings. The resultant double-track segment would be 2.80 miles in length. The benefits of this project would be improved operational reliability, reduced trip times and increased capacity. This improvement work corresponds with the NCTD San Dieguito River Bridge Replacement and Second Track Project Study Report (January 1999).

*San Clemente Alternatives Analysis (PS-19A):* An environmental study is recommended for analysis of alternatives for improving safety and capacity through San Clemente Bluffs areas. This project is key to providing safe, fast, frequent and reliable service in the future and should be initiated now, because securing funding and completing the environmental process would require significant community involvement before the projects could be implemented. Environmental studies in this sensitive area should be coordinated with proposed environmental review by the CA HSRA. Please refer to Vision project PS-63, San Clemente Beach Second Main Track and Grade Separation, and PS-64, San Clemente to CP Songs Second Main Track.

*Del Mar Alternatives Analysis (PS-19B):* An environmental study is recommended for analysis of alternatives for improving capacity through Del Mar. This project is consistent with NCTD's long-range goal of double-tracking the entire main line subdivision from the Orange County Line to San Diego. NCTD has, furthermore, made provisions for these track alternatives and the related track options through the City of Del Mar to be studied as part of planning studies scheduled to begin in 2001. Double-tracking this corridor would increase operational flexibilities and reduce trip time. Environmental studies in this sensitive area should be coordinated with proposed environmental review by the CA HSRA. Refer to Vision project PS-65, Del Mar Tunnel, as it relates to this alternatives analysis.

*Sorrento to Miramar Curve Realignment and Second Main Track (PS-20A):* The Sorrento to Miramar Curve Realignment and Second Main Track project is an ongoing NCTD project that would realign curves and construct a second main track from MP 249.80 to MP 252.90. The benefits of the project would include improved reliability, reduced trip times and increased capacity. The project would provide these much-needed operational benefits until such time as the long-term Vision project entitled Miramar Tunnel (PS-66) would be completed.

*Miramar Tunnel Study (PS-20B):* An environmental study is recommended for analysis of a proposed Miramar tunnel project. This project is key to providing safe, fast, frequent and reliable service in the future and should be initiated now, because securing funding and completing the environmental process would require significant community involvement before the projects can be implemented. Environmental studies in this sensitive area should be coordinated with proposed environmental review by the CA HSRA. Refer to Vision project, PS-66, Miramar Tunnel.

*CP Elvira to False Bay Passing Siding Second Main Track (PS-21):* This improvement project, located ten miles north of San Diego, would construct a second main track between CP Elvira and False Bay Passing Siding, 2.60 miles long, from MP 257.90 to MP 260.50. This track would be constructed to FRA Class 5 standards for a maximum speed for passenger trains of 90 mph. Bridge No. 259.6 would be replaced with a new double track bridge. This project would also realign curves at Elvira, between MP 257.50 and MP 258.50. The preliminary costs reflected for this project do not include any potential right-of-way acquisitions. The benefits of this project would be improved operational reliability, reduced trip times and increased capacity. This improvement work would be coordinated with the Metropolitan Transit Development Board's (MTDB's), Mid-Coast Light-Rail Project, which proposes light-rail commuter track project in this area.

*San Diego or National City Layover Facility (PS-22):* This new facility would allow intercity trains to undergo light maintenance work and to be stored in the San Diego area. This would improve equipment utilization by providing faster turn-around times, allowing more roundtrips with fewer train sets.

*San Diego Depot Development (PS-23):* This project would purchase and rehabilitate the San Diego Depot. This project would provide needed amenities for travelers.

*Rolling Stock (PS-24):* This project would purchase two modern trainsets, with locomotives needed to operate the increased frequencies proposed. Typically, with the level of service proposed on the Pacific Surfliners corridor, equipment maintenance standards would specify a ten-percent fleet "overhead" to allow for periodic maintenance and inspections. This ten-percent margin is an industry standard and would call for one spare set of equipment to support every ten trainsets in daily service.

*Passenger Service Enhancements and New Route Studies (PS-25):* New ticket vending machines, message boards, and automated fare collection systems would be installed to improve customer satisfaction by this project. In addition, a comprehensive route study including preliminary engineering and ridership analysis would be conducted to determine the feasibility of providing passenger rail service from the Coachella Valley to Los Angeles.

### NEAR-TERM PERIOD

Near-term projects have been identified that would achieve the Near-term service goals for the Pacific Surfliner Corridor during the four- to eight-year period, while making a significant investment towards the long-term, 20-year Vision for the corridor. These projects are listed in Table PS-6 and described herein.

## Table PS-6
## Pacific Surfliner Corridor Near-Term Projects List

| Description | | Project Cost (in millions, based on year 2000 dollars) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Project No. | Project Name | Project Devel-opment (PE, EIR/S, CM) | Right-of-Way | Track-work/ Structures | Stations | Signal/ Systems | Grade Crossings | Rolling Stock | **Total Cost** |
| PS-26 | San Luis Obispo to Santa Barbara Signal Upgrades | 20.39 | 0.00 | 3.16 | 0.00 | 126.82 | 0.00 | 0.00 | **150.37** |
| PS-27 | San Luis Obispo to Santa Barbara Track and Signal Upgrades | 23.80 | 0.00 | 87.76 | 0.00 | 87.95 | 0.00 | 0.00 | **199.51** |
| PS-28 | Tangair Siding Exten-sion | 1.57 | 2.26 | 5.94 | 0.00 | 2.74 | 0.00 | 0.00 | **12.51** |
| PS-29 | Seacliff Curves Re-alignment | 0.10 | 4.32 | 0.65 | 0.00 | 0.00 | 0.00 | 0.00 | **5.07** |
| PS-30 | Montalvo Curve Re-alignment | 0.04 | 0.14 | 0.28 | 0.00 | 0.09 | 0.00 | 0.00 | **0.55** |
| PS-31 | Santa Clara River Curve Realignment | 0.08 | 1.85 | 0.48 | 0.00 | 0.50 | 0.00 | 0.00 | **2.91** |
| PS-32 | CP West Camarillo Curve Realignment | 0.08 | 1.69 | 0.50 | 0.00 | 0.47 | 0.00 | 0.00 | **2.74** |
| PS-33 | CP Posas to MP 423 Second Main Track | 3.12 | 3.50 | 16.64 | 0.00 | 3.69 | 0.00 | 0.00 | **26.95** |
| PS-34 | Strathearn Siding Curve Realignment | 0.02 | 0.00 | 0.10 | 0.00 | 0.02 | 0.00 | 0.00 | **0.14** |
| PS-35 | Simi Valley to CP Strat-hearn Second Main Track | 2.98 | 0.00 | 10.37 | 4.18 | 2.59 | 2.22 | 0.00 | **22.34** |
| PS-36 | CP Raymer to CP De Soto Second Main Track | 3.82 | 0.00 | 14.58 | 0.00 | 3.84 | 2.24 | 0.00 | **24.48** |
| PS-37 | Burbank Siding Exten-sion | 0.63 | 0.00 | 1.07 | 0.00 | 2.76 | 0.29 | 0.00 | **4.75** |
| PS-38 | Hobart Flyover | 9.00 | 0.00 | 58.35 | 0.00 | 0.22 | 0.00 | 0.00 | **67.57** |
| PS-39 | Hobart to Commerce Fourth Main Track | 3.14 | 0.00 | 9.46 | 0.00 | 4.73 | 0.00 | 0.00 | **17.33** |
| PS-40 | Orange County Sup-plemental System | 0.82 | 0.00 | 0.40 | 2.54 | 3.28 | 3.24 | 0.31 | **10.59** |
| PS-41 | CP Avery to La Zanja Second Main Track | 2.38 | 0.00 | 13.33 | 0.00 | 1.97 | 0.22 | 0.00 | **17.90** |
| PS-42 | Pacific Coast Highway Curve Realignment | 0.39 | 0.00 | 2.56 | 0.00 | 0.00 | 0.00 | 0.00 | **2.95** |
| PS-43 | CP Serra to San Clemente Second Main Track | 2.94 | 0.00 | 17.01 | 2.54 | 2.14 | 0.00 | 0.00 | **24.63** |
| PS-44 | San Diego County Cab Signal System | 0.28 | 0.00 | 0.00 | 0.00 | 1.80 | 0.00 | 1.10 | **3.18** |
| PS-45 | CP Escondido Junction to CP Farr Second Main Track | 3.93 | 0.00 | 19.19 | 0.00 | 4.35 | 2.04 | 0.00 | **29.51** |
| PS-46 | Torrey Pines to CP Tor-rey Second Main Track | 14.69 | 0.00 | 89.22 | 2.79 | 3.22 | 0.40 | 0.00 | **110.32** |
| PS-47 | Safety and Mobility En-hancements | 1.54 | 0.00 | 0.00 | 0.00 | 0.00 | 12.46 | 0.00 | **14.00** |
| **Subtotal** | | **95.74** | **13.76** | **351.05** | **12.05** | **253.18** | **23.11** | **1.41** | **750.30** |

<u>*San Luis Obispo to Santa Barbara Signal Upgrades (PS-26)*</u>*:* This is a joint project that would benefit both the Coast Corridor and the Pacific Surfliner Corridor. This project upgrades 147.00 miles of signal system between Gilroy and Santa Barbara, from MP 80.10 to MP 355.80.

| Physical Limits | Starting Milepost | Ending Milepost | Project Number |
|---|---|---|---|
| North of San Luis Obispo | | | |
| San Luis Obispo-Salinas | 80.10 | 113.04 | CO-03/PS-26 |
| Salinas-Soledad | 113.04 | 139.60 | CO-03 |
| Soledad-San Lucas | 139.60 | 167.20 | PS-26 |
| San Lucas-Bradley | 167.20 | 192.74 | CO-03 |
| Bradley-Waldorf | 192.74 | 278.76 | PS-26 |
| Physical Limits | Starting Milepost | Ending Milepost | Project Number |
| South of San Luis Obispo | | | |
| Devon-Concepcion | 278.76 | 320.73 | PS-27 |
| Concepcion-Ellwood | 320.73 | 355.80 | PS-27 |

The existing CTC signal system would be extended from MP 80.10, near Gilroy, to MP 113.04, near Salinas, by installing new CTC communications and upgrading the existing CTC signal system with solid-state electronics. Two new power-operated No. 20 turnouts and control points would be installed.

The existing ABS and CTC signal systems would be upgraded to a CTC signal system from MP 139.60, at Soledad, to MP 167.20, near San Lucas. Three new power-operated No. 20 turnouts and three control points would be installed.

The existing ABS and CTC signal system would also be upgraded to a CTC signal system from MP 192.74, at Bradley, to MP 278.76, near Waldorf. Five new power-operated No. 20 turnouts and five control points would be installed.

When this project is completed, CTC would be in service continuously from Gilroy to Los Angeles.

This project would improve operational reliability and increase capacity between Gilroy and Santa Barbara.


***Figure PS-9: Pismo Beach to Goleta***

<u>*San Luis Obispo to Santa Barbara Track and Signal Upgrades (PS-27)*</u>*:* This project would upgrade track and outdated signal systems on the Coast Corridor between San Luis Obispo and Santa Barbara. This project upgrades 107.36 miles of track between San Luis Obispo and Santa Barbara, from MP 248.44 to MP 355.80, from FRA Class 3 to Class 4 track standards. This track upgrade would include new CWR installation, spot timber tie replacement, ballasting and track surfacing and aligning.

An island CTC signal system would be installed from MP 278.76, near Devon, to MP 320.73, at Concepcion. This project would upgrade the existing ABS signal system with CTC communications. Eleven new power-operated No. 20 turnouts and control points would be installed.

The existing CTC signal system would be extended from MP 320.73, at Concepcion, to MP 355.80, at Ellwood. This project would install 35.10 miles of new CTC signal system and upgrade 15.00 miles of the existing ABS signal system with CTC communications. Five new power-operated turnouts and control points would be installed.

This project would improve operational reliability, reduce trip time and increase capacity between San Luis Obispo and Santa Barbara.


***Figure PS-10: Summerland to Oxnard***

<u>*Tangair Siding Extension (PS-28)*</u>: This siding extension project is located 44 miles south of San Luis Obispo. This project is an approximate 0.85-mile northward extension of the existing siding at Tangair, from MP 293.67 to MP 292.82. This project would also realign Curve No. 293.50 to reduce track curvature from five to two degrees. This siding track would be constructed on new embankment to FRA Class 4 standards for a maximum speed for passenger trains of 79 mph. The existing turnout at MP 294.82 would be removed and a No. 20 turnout would be installed. The existing turnout at MP 293.67 would be removed. A new No. 20 turnout would be installed at MP 292.82. A new CTC signal system would also be installed for the siding extension. This siding extension would be required to provide additional capacity and operational reliability for both freight and passenger traffic.

<u>*Seacliff Curves Realignments (PS-29)*</u>*:* This project, located 6.50 miles north of Ventura, would realign four curves east of Seacliff, between MP 387.50 and MP 381.70, to reduce track curvature from five to two degrees maximum. The curves would be constructed to FRA Class 5 standards. An additional 8.63 acres of right-of-way would be acquired. This infrastructure improvement would reduce trip times by increasing train speeds on the curves.

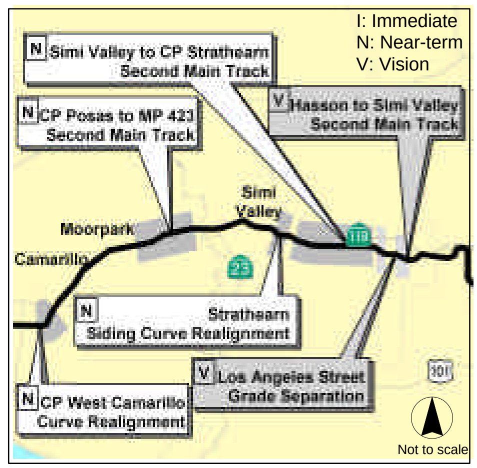



***Figure PS-11: Oxnard to Simi Valley***

<u>*Montalvo Curve Realignment (PS-30)*</u>*:* This project would realign 1.00 mile of main line track at Montalvo, between MP 398.10 and MP 399.10. The Montalvo Curve is located five miles north of Oxnard Station. This realignment would reduce the maximum track curvature from three degrees to two degrees. This project would construct 0.29 mile of new track to FRA Class 5 standards. An additional 0.29 acre of right-of-way would be acquired. This infrastructure improvement reduces trip times by increasing train speeds on the curve.

<u>*Santa Clara River Curve Realignment (PS-31)*</u>: This project, located two miles north of Oxnard Station, would realign approximately 0.40 mile of main line track east of the Santa Clara River, between MP 401.90 and MP 402.30, to reduce the maximum track curvature from three to two degrees. This project would construct 0.40 mile of new track to FRA Class 5 standards. An additional 3.69 acres of right-of-way would be acquired. This infrastructure improvement would reduce trip times by increasing train speeds on the curve.

<u>*CP West Camarillo Curve Realignment (PS-32)*</u>*:* This project, located seven miles south of Oxnard Station, would realign 0.50 mile of main line track at CP West Camarillo, between MP 411.50 and MP 412.00, to reduce the maximum track curvature from three degrees to two degrees. This project would construct 0.50 mile of new track to FRA Class 5 standards. An additional 3.38 acres of right-of-way would be acquired. This infrastructure improvement would reduce trip times by increasing train speeds on the curve.

<u>*CP Las Posas to MP 423 Second Main Track (PS-33)*</u>*:* This improvement project, located in Moorpark, would construct a second main track from CP Posas to MP 423, 3.50 miles long, from MP 423.00 to MP 426.50. This second main track would be constructed with 45-mph turnouts on each end. New signals

would be installed on both tracks west of Moorpark Station. The benefits of this project are improved operational reliability and increased capacity.

<u>Strathearn Siding Curve Realignment (PS-34)</u>: This project, which is located five miles south of Moorpark Station, would realign 0.40 mile of main line track and the Strathearn Siding track, between MP 431.70 and MP 432.10, to reduce the maximum track curvature from three to two degrees. This project would construct 0.40 mile of new track to FRA Class 5 standards. This infrastructure improvement would reduce trip times by increasing train speeds on the curve.

<u>Simi Valley to CP Strathearn Second Main Track (PS-35)</u>: This improvement project is located in Simi Valley. This project would construct a second main track from Simi Valley to CP Strathearn, 4.67 miles long, from MP 432.82 to MP 438.15. The second main track would be constructed to FRA Class 5 standards. A new crossover would be installed. Seven rail/highway grade crossings would be upgraded. This project would also construct a second passenger platform at Simi Valley Station adjacent to the new second main track.

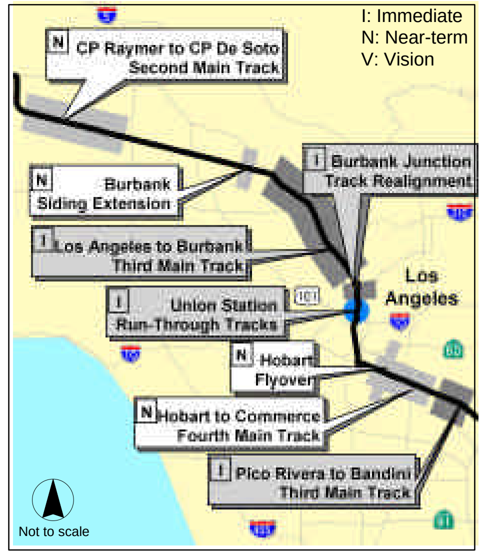



***Figure PS-12: Chatsworth to Pico Rivera***

The benefits of this project would be improved operational reliability and increased capacity.

<u>CP Raymer to CP De Soto Second Main Track (PS-36)</u>: This improvement project, located in Northridge, would construct a second main track from CP Raymer to CP De Soto, 6.50 miles long, from MP 446.60 to MP 453.10. This second main track would be constructed to FRA Class 5 standards. A new concrete bridge would also be constructed. The benefits of this project are improved operational reliability and increased capacity.

<u>Burbank Siding Extension (PS-37)</u>: This project would be an approximate 0.70-mile extension of the existing Burbank Siding in Burbank northward to CP Lockheed, from MP 461.50 to MP 460.80. This track would be constructed to FRA Class 5 standards. The existing turnout at MP 461.50 would be removed. A new No. 20 turnout would be installed at MP 460.80. A new CTC signal system would also be installed for the siding extension. This siding extension, which is required to clear freight trains, would provide additional capacity and operational reliability for both freight and passenger traffic.


***Figure PS-13: Whittier to San Clemente***

<u>Projects PS-38 and PS-39 (Redondo Junction-Fullerton Passenger/Freight Corridor)</u>: These two projects would complete the major corridor work started with PS-06 and PS-07 in the Immediate time frame. While the track alignments at Hobart and Commerce must be engineered accurately to insure compatibility with the other projects, the work at the UPRR crossing at Hobart and the alignment through Vernon/Commerce would require a more intense level of engineering design. The Hobart flyover would require a very precise design to be compatible in terms of route geometry with the Redondo Junction flyover that will be placed in service during 2001.

The Hobart to Commerce Fourth Main Track through Vernon would require a demapping and possible relocation of an existing city street. The work in Commerce would require coordination with the City of

Commerce, which owns a portion of the land and has an existing project to improve the station facilities at Commerce.

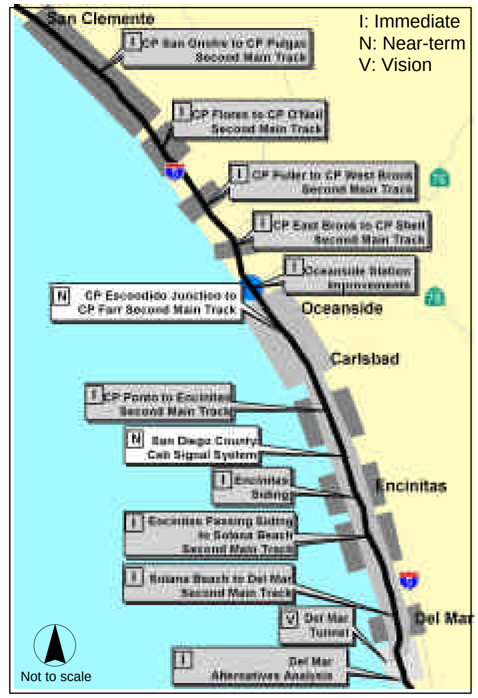



*Figure PS-14: San Clemente to Del Mar*


*Figure PS-15: Del Mar to National City*

<u>Hobart Flyover (PS-38)</u>: This infrastructure project, located 4.50 miles south of LAUS, would raise the two passenger main tracks from the Redondo Junction project to pass over the UPRR San Pedro Branch tracks, from MP 144.00 to MP 145.00. The passenger main tracks would descend to the south side of the BNSF tracks. These tracks would be constructed to FRA Class 5 standards for a maximum speed for passenger trains of 90 mph. A double-track concrete viaduct, 0.50 mile long, would be constructed. The Hobart Flyover, like the Redondo Flyover that is currently under construction, would take Metrolink and Amtrak over the UPRR main tracks, eliminating delays and increasing speeds. The benefits of this project would be improved operational reliability, reduced trip times and increased capacity.

<u>Hobart to Commerce Fourth Main Track (PS-39)</u>: This major infrastructure project is located five miles south of LAUS. This project would construct a 3.7-mile-long fourth main track from Hobart to Commerce, between MP 145.00 and MP 148.70, on the south side of the BNSF main tracks. The two south main tracks would connect to the passenger main tracks from the Hobart Flyover project, or the two south main tracks through Hobart Tower to the Redondo Junction Flyover. This fourth main track would be constructed to FRA Class 5 standards for a maximum speed for passenger trains of 90 mph. Four existing No. 10 turnouts would be removed. Three new No. 20 turnouts would be installed. New bridges would also be constructed. The benefits of this project would be improved operational reliability and increased capacity.

<u>Supplemental Signal System (Orange County PS-40 and San Diego County PS-44)</u>: FRA regulations require that, where any train operates at speeds of 80 mph or greater, an automatic cab signal system, ATS, or automatic train control system must be installed. The existing ATS system in Orange and San Diego Counties is a supplemental signal system, which allows operation up to 90 mph. Potential expansion of 90-mph operation, improvement to 110 mph or even 125 mph, would require installation of one of these signal systems that would include both wayside and on-board equipment.

<u>Orange County Supplemental System (PS-40)</u>: This improvement project would increase speeds to 110 mph by upgrading wayside and onboard equipment on the applicable segments. Cab signaling would be implemented between Santa Ana (MP 175.20) and San Juan Capistrano (MP 196.80). This installation would reduce trip times by increasing train speeds along the upgraded segment. By including speed control on the onboard apparatus, as is the practice on all of Amtrak's cab signal equipped locomotives and cab control cars, safety of operation would also be enhanced. Eleven rail/highway grade crossings would be

upgraded by this project. Owing to the proposed high-speed operations, grade-separating these eleven grade crossings would be preferable to installing state-of-the-art warning systems. The capital costs necessary to grade-separate these crossing, however, are not included in this project's cost estimate.

*CP Avery to La Zanja Second Main Track (PS-41):* This improvement project would construct a second main track between CP Avery and La Zanja, 2.90 miles long, from MP 193.90 to MP 196.80. This project, which is immediately north of San Juan Capistrano Station, would reduce wait time for trains in San Juan Capistrano Station. This second main track would be constructed to FRA Class 5 standards for a maximum speed for passenger trains of 90 mph. One No. 24 turnout would be installed. Two public rail/highway grade crossings and one private rail/highway grade crossing would be constructed. The benefits of this project would be improved operational reliability, reduced trip times and increased capacity.

*Curve Realignment at Pacific Coast Highway (PS-42):* This project, located five miles north of San Clemente Station, would realign a 0.40-mile-long curve at Pacific Coast Highway, between MP 200.00 and MP 200.40, to reduce track curvature. The realigned track would be constructed to FRA Class 5 standards for a maximum speed for passenger trains of 90 mph. This project would also replace Bridge No. 200.2. This infrastructure improvement would result in reduced trip times.

*CP Serra to San Clemente Second Main Track (PS-43):* This project would extend the existing Serra siding (MP 199.90) southward 4.00 miles to San Clemente (MP 203.90). This second main track would extend through San Clemente Station. This second main track would be constructed to FRA Class 5 standards for a maximum speed for passenger trains of 90 mph. The project would also grade-separate the Beach Road crossing at MP 201.00. Train speeds would increase to 110 mph between MP 200.40 and MP 203.80. The benefits of this project would be improved operational reliability, reduced trip times and increased capacity.

*San Diego County Supplemental Signal System (PS-44):* This improvement project would increase speeds to 110 mph by upgrading wayside and onboard equipment on the applicable segments. Cab signal upgrades would also be implemented between Oceanside (MP 226.40) and Del Mar (MP 243.50). These cab signal upgrades would reduce trip times by increasing train speeds along the upgraded segment. Twelve rail/highway grade crossings would be upgraded by this project. Grade-separating these twelve grade crossings along the segment should be considered during the implementation of this project. It is recognized that there are sensitive community issues associated with running trains at higher speeds. Different methods, including outreach programs and meetings to inform the public, would address this safety issue. Safety issues and quiet zones should be addressed in the beginning stages of these projects. The capital costs necessary to grade-separate these crossings are not included in this project's cost estimate.

*CP Escondido Junction to CP Farr Second Main Track (PS-45):* This improvement project, which is located eight miles south of Oceanside, would construct a second main track between CP Escondido Junction and CP Farr, 4.20 miles long, from MP 227.20 to MP 231.40. This track would be constructed to FRA Class 5 standards for a maximum speed for passenger trains of 90 mph. One No. 20 turnout and two No. 10 turnouts would be removed. One No. 10 turnout would be installed. Six new rail/highway grade crossings with flashing light signals and short arm gates would be installed at MP 227.20, MP 228.00, MP 229.20, MP 229.30, MP 230.10 and MP 231.40. Three new double-track concrete bridges would be constructed at MP 227.60, MP 228.60 and MP 230.60. The benefits of this project would be improved operational reliability, reduced trip times and increased capacity.

*Torrey Pines to CP Torrey Second Main Track (PS-46):* This improvement project, which is located twenty miles north of San Diego, would construct a second main track between Torrey Pines and CP Torrey, 2.80 miles long, from MP 246.00 to MP 248.80. This track would be constructed to FRA Class 5 standards for a maximum speed for passenger trains of 90 mph. One No. 20 turnout and two No. 24 turnouts would be installed. Bridges Nos. 246.1, 246.9, 247.1, 247.7, 248.5 and 248.7, which are currently single-track bridges, would be replaced with double-track concrete bridges. A concrete viaduct, 1.60

miles long, would be constructed over wetlands. The benefits of this project would be improved operational reliability, reduced trip times- and increased capacity.

*Safety and Mobility Enhancements (PS-47):* This project would identify specific roadway/railroad intersection improvements to improve rail/highway grade crossing safety and reduce traffic congestion on local streets as frequencies and speeds are increased along the Pacific Surfliner Corridor. Included would be grade separations, improving roadway approaches, widening roads, quiet zones, road closures and upgrading warning systems.

### VISION

Vision projects listed in Table PS-7 and described below are those projects that would be implemented over a nine- to twenty-year period to meet the 20-year service and trip goals for the Pacific Surfliner Corridor. Many of these Vision projects would make changes to the infrastructure to allow for passenger train speeds over 79 mph – in most cases 90 or 110 mph. Supplemental signal systems would be required for high-speed passenger trains if they are to run over 79 mph. These wayside signal upgrades or on-board systems are not included in the estimate costs listed below.

**Table PS-7**
**Pacific Surfliner Corridor Vision Projects List**

| Description | | Project Cost (in millions, based on year 2000 dollars) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Project No. | Project | Project Devel-opment (PE, EIR/S, CM) | Right-of-Way | Track-work/ Structures | Stations | Signal/ Systems | Grade Crossings | Rolling Stock | **Total Cost** |
| PS-48 | Hadley to Callender Curve Realignments | 7.88 | 7.44 | 66.11 | 0.00 | 2.08 | 0.00 | 0.00 | **83.51** |
| PS-49 | MP 276 Track Re-alignment and Highway 1 Overpass Replace-ment | 3.37 | 1.43 | 27.26 | 0.00 | 0.54 | 0.00 | 0.00 | **32.60** |
| PS-50 | Waldorf Siding Exten-sion | 0.94 | 0.00 | 4.20 | 0.00 | 3.18 | 0.00 | 0.00 | **8.32** |
| PS-51 | Devon to Tangair Curve Realignments | 9.97 | 7.56 | 82.38 | 0.00 | 2.84 | 0.00 | 0.00 | **102.75** |
| PS-52 | Surf to Arguello Curve Realignments | 10.50 | 12.22 | 81.98 | 0.00 | 2.02 | 0.00 | 0.00 | **106.72** |
| PS-53 | Sudden to Concepcion Curve Realignments | 6.12 | 12.23 | 42.64 | 0.00 | 1.12 | 0.00 | 0.00 | **62.11** |
| PS-54 | Concepcion to Gato Curve Realignments | 3.18 | 6.02 | 23.09 | 0.00 | 0.72 | 0.00 | 0.00 | **33.01** |
| PS-55 | San Augustine to Sa-cate Curve Realign-ments | 8.85 | 18.36 | 60.95 | 0.00 | 1.54 | 0.00 | 0.00 | **89.70** |
| PS-56 | Gaviota to Tajiguas Curve Realignments | 1.18 | 0.00 | 10.75 | 0.00 | 0.55 | 0.00 | 0.00 | **12.48** |
| PS-57 | Tajiguas to Ellwood Curve Realignments | 4.93 | 8.54 | 34.50 | 0.00 | 2.24 | 0.00 | 0.00 | **50.21** |
| PS-58 | Los Angeles Street Grade Separation | 4.86 | 0.00 | 43.26 | 0.00 | 0.48 | 0.00 | 0.00 | **48.60** |
| PS-59 | Hasson to Simi Valley Station Second Main Track | 2.52 | 0.00 | 14.10 | 0.00 | 1.63 | 0.71 | 0.00 | **18.96** |
| PS-60 | Los Nietos and DT Junctions Track Re-alignment | 12.63 | 0.00 | 76.75 | 0.00 | 1.80 | 3.61 | 0.00 | **94.79** |
| PS-61 | Orange Junction Curve Realignment | 0.19 | 0.00 | 1.11 | 0.00 | 0.00 | 0.15 | 0.00 | **1.45** |

**Table PS-7 (continued)**
**Pacific Surfliner Corridor Vision Projects List**

| Description | | Project Cost (in millions, based on year 2000 dollars) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Project No. | Project | Project Devel-opment (PE, EIR/S, CM) | Right-of-Way | Track-work/ Structures | Stations | Signal/ Systems | Grade Crossings | Rolling Stock | **Total Cost** |
| PS-62 | La Zanja to CP Capis-trano Second Main Track | 1.81 | 0.00 | 7.56 | 4.18 | 0.53 | 0.00 | 0.00 | **14.08** |
| PS-63 | San Clemente Beach Second Main Track | 42.87 | 0.00 | 278.94 | 0.00 | 1.33 | 0.00 | 0.00 | **323.15** |
| PS-64 | San Clemente Beach to CP Songs Second Main Track | 25.50 | 0.00 | 165.99 | 0.00 | 1.05 | 0.00 | 0.00 | **192.54** |
| PS-65 | Del Mar Tunnel | 47.19 | 0.00 | 304.45 | 0.00 | 2.61 | 0.00 | 0.00 | **354.25** |
| PS-66 | Miramar Tunnel | 119.73 | 0.00 | 778.84 | 0.00 | 0.30 | 0.00 | 0.00 | **898.87** |
| PS-67 | False Bay Passing Sid-ing to CP Friar Second Main Track | 4.43 | 0.00 | 25.40 | 0.00 | 3.44 | 0.00 | 0.00 | **33.27** |
| **Subtotal** | | **318.65** | **73.80** | **2,130.26** | **4.18** | **30.00** | **4.47** | **0.00** | **2,561.36** |

*Hadley to Callender Curve Realignments (PS-48):* This project, located 12 miles south of San Luis Obispo, would relocate 4.80 miles of main line track at three locations between Hadley and Callender, from MP 225.10 to MP 265.50, to reduce track curvature. The project would construct 4.80 miles of new main track and embankment on a new right-of-way. The 12 existing curves would be reduced to six curves with a three-degree maximum curvature. Three new 80-foot concrete railroad trestles would be constructed. A new overpass at Price Canyon Road would also be constructed. This infrastructure improvement project would reduce trip times by increasing train speeds from 50 to 90 mph.

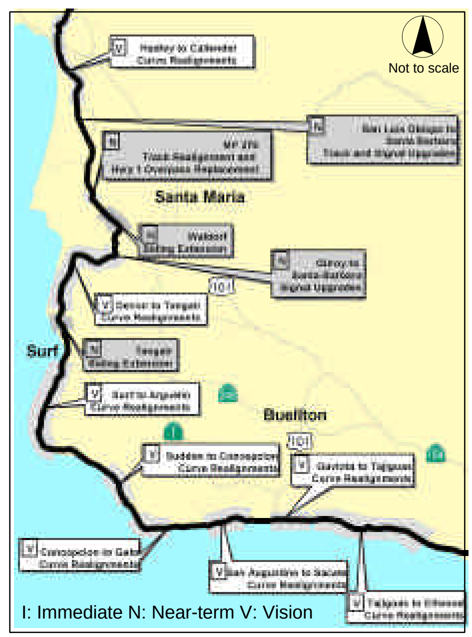



***Figure PS-16: Pismo Beach to Goleta***

*MP 276 Track Realignment and Highway 1 Overpass Replacement (PS-49):* This major track realignment project is located south of Guadalupe. This project would relocate 1.80 miles of main line track, from MP 275.20 to MP 277.00, to reduce track curvature. The curvature of two existing curves would be reduced to two degrees maximum. This project would also replace the Highway 1 overpass. The project would construct 1.80 miles of new main track and embankment. This infrastructure improvement project would reduce trip times by increasing train speeds from 45 to 90 mph.

*Waldorf Siding Extension (PS-50):* This infrastructure project is located 30 miles south of San Luis Obispo. This project would be an approximate 1.00-mile southward extension of the existing siding at Waldorf to MP 278.60. This track would be constructed on new embankment to FRA Class 4 standards for a maximum speed for passenger trains of 79 mph. The existing turnout at MP 276.76 would be removed and a No. 20 turnout would be installed. The existing turnout at MP 277.59 would be removed. A new No. 20 turnout would be installed at MP 278.60. A new CTC signal system would also be installed for the siding extension. This siding extension would be required to provide additional capacity and operational reliability for both freight and passenger traffic.

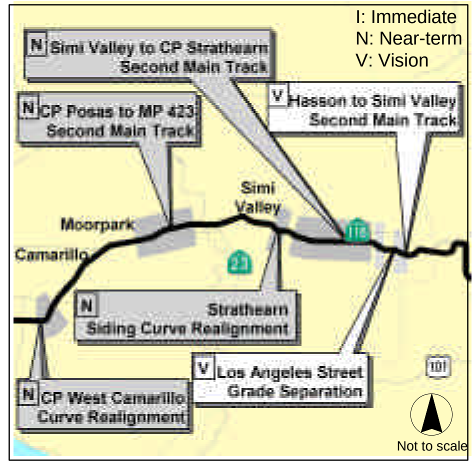



*Figure PS-17: Oxnard to Simi Valley*


*Figure PS-18: Whittier to San Clemente*

*Devon to Ellwood Curve Realignment Projects (PS-51 through PS-57):* When the railroad was built along the coast in the 19th century, railroad builders followed the contours of the land to minimize earthmoving and tunneling operations. This created many miles of curve along what is today the Pacific Surfliner Corridor. Straightening these curves would reduce run times (trains can attain a higher speed) and would reduce maintenance cost (lessening the wear and maintenance required by tracks).

*Devon to Tangair Curve Realignments (PS-51):* This major curve realignment project, located 48 miles south of San Luis Obispo, would relocate 12.10 miles of main line track between Devon and Tangair, from MP 279.80 to MP 296.80, to reduce track curvature. The project would construct 8.90 miles of new main track and 2.00 miles of retaining walls. The curvature of 24 existing curves would be reduced to three degrees maximum or eliminated. This infrastructure improvement project would reduce trip times by increasing train speeds from 50 to 79 mph.

*Surf to Arguello Curve Realignments (PS-52):* This project, 67 miles north of Santa Barbara, would relocate 6.30 miles of main line track between Surf and Arguello, from MP 297.90 to MP 311.40, to reduce track curvature. The project would construct 6.30 miles of new main track and retaining walls. The curvature of 16 existing curves would be reduced to two degrees maximum or eliminated. This infrastructure improvement project would reduce trip times by increasing train speeds from 79 to 110 mph.

*Sudden to Concepcion Curve Realignments (PS-53):* This project would realign 3.50 miles of main line track between Sudden and Concepcion, 50 miles north of Santa Barbara, from MP 315.00 to MP 319.80, to reduce track curvature to 1 degree, 30 minutes maximum. This project would realign or eliminate 14 existing curves. The project would construct 3.50 miles of new main track and retaining walls. The curvature of six existing curves would be reduced to 1 degree, 30 minutes maximum. Eight existing curves would be eliminated. A new 900-foot concrete trestle would be constructed over Jalama Creek. This infrastructure improvement project would reduce trip times by increasing train speeds from 60 to 110 mph.

*Concepcion to Gato Curve Realignments (PS-54):* This project is located 44 miles north of Santa Barbara. This project would relocate 3.30 miles of main line track between Concepcion and Gato, from MP 321.50 to MP 326.70, to reduce track curvature. Five existing curves would be realigned. The project would construct 2.30 miles of new main track and retaining walls. The curvature of five existing curves would be reduced to 1 degree, 30 minutes maximum. This infrastructure improvement project would reduce trip times by increasing train speeds from 65 to 110 mph.

San Augustine to Sacate Curve Realignments (PS-55): This project, located 35 miles north of Santa Barbara, would realign seven curves, totaling 4.70 miles of main line track, between San Augustine and Sacate, from MP 328.20 to MP 332.90, to reduce track curvature. The project would construct 4.70 miles of new main track and retaining walls. The curvature of seven existing curves would be reduced to 1 degree, 30 minutes maximum. This infrastructure improvement project would reduce trip times by increasing train speeds from 65 to 110 mph.

Gaviota to Tajiguas Curve Realignments (PS-56): This project, located 30 miles north of Santa Barbara, would relocate 2.00 miles of main line track between Gaviota and Tajiguas, from MP 335.10 to MP 341.00, to reduce track curvature. This project would realign four existing curves. The project would construct 1.76 miles of new main track and 1.50 miles of retaining walls. The curvature of four existing curves would be reduced to one degree maximum. This infrastructure improvement project would reduce trip times by increasing train speeds from 75 to 110 mph.

Tajiguas to Ellwood Curve Realignments (PS-57): This major curve realignment project, located 13 miles north of Santa Barbara, would realign eleven curves, totaling 4.70 miles of main line track, between Tajiguas and Ellwood, from MP 341.40 to MP 354.40, to reduce track curvature. The project would construct 3.20 miles of new main track and 3.00 miles of retaining walls. The curvature of eight existing curves would be reduced to two degrees maximum. This infrastructure improvement project would reduce trip times by increasing train speeds from 65 to 110 mph.

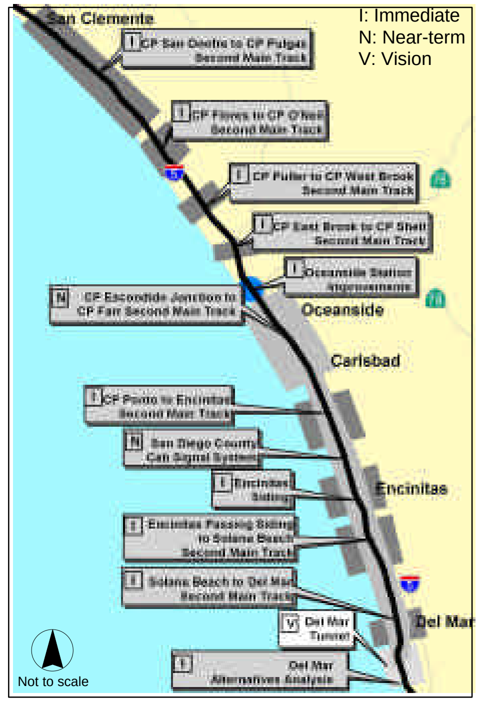



*Figure PS-19: San Clemente to Del Mar*

Los Angeles Street Grade Separation (PS-58): This project would grade-separate Los Angeles Street (MP 437.70) in Simi Valley. This project would also realign the 0.30-mile-long curve south of Los Angeles Street. A new Los Angeles Street overpass would be constructed. The track realignment would construct 0.48 mile of new track to FRA Class 5 standards for a maximum speed for passenger trains of 90 mph. This project would reduce trip time and increase public safety.

Hasson to Simi Valley Station Second Main Track (PS-59): This improvement project, located adjacent to Simi Valley Station, would construct a second main track from Hasson northward to Simi Valley Station, 1.00 mile long, from MP 439.10 to MP 438.10. This second main track would be constructed to FRA Class 5 standards for a maximum speed for passenger trains of 90 mph. The benefits of this project would be improved operational reliability and increased capacity.


*Figure PS-20: Del Mar to National City*

Los Nietos and DT Junctions Track Realignment (PS-60): This project would eliminate the railroad crossing diamonds at Los Nietos Junction (MP 153.00) by connecting UPRR to the BNSF San Bernardino Line at DT Junction (MP 152.10). Crossovers would be constructed between DT Junction and Los Nietos

Junction and a turnout would be constructed to the UPRR at Los Nietos Junction. The track would be constructed to FRA Class 4 standards for a maximum speed for passenger trains of 79 mph. The benefits of this project would be improved operational reliability and reduced trip times.

This project may also eliminate the railroad crossing diamonds at DT Junction (MP 152.10). The project could provide UPRR with alternate capacity on the UPRR Los Angeles Subdivision, from Montebello to Bartello.

*Orange Junction Curve Realignment (PS-61):* This improvement project, located on the north side of Orange Station, would realign 0.70 mile of curved track, between MP 171.80 and MP 172.50, at Orange Junction to reduce track curvature and thereby increase train speeds and reduce trip times. This realigned track would be constructed to FRA Class 5 standards for a maximum speed for passenger trains of 90 mph. Two new rail/highway grade crossings with flashing light signals and short-arm gates would be installed, at MP 171.80 and MP 172.30.

*La Zanja to CP Capistrano Second Main Track (PS-62):* This improvement project would construct a second main track between La Zanja and CP Capistrano through San Juan Capistrano Station, 1.20 miles long, from MP 196.80 to MP 198.00. The second main track would be constructed to FRA Class 5 standards for a maximum speed for passenger trains of 90 mph. Bridge No. 197.9, which is currently a single-track bridge, would be replaced with a double-track concrete bridge. A second station platform at San Juan Capistrano Station would also be constructed. The benefits of this project would be improved operational reliability, improved trip times and increased capacity.

*San Clemente Beach Second Main Track and Grade Separation (PS-63):* This improvement project would construct a 2.40-mile-long second main track at San Clemente Beach, from MP 203.90 to MP 206.30. This second main track would be constructed to FRA Class 5 standards for a maximum speed for passenger trains of 90 mph. This improvement project would also construct a concrete viaduct to grade-separate this 2.40-mile-long section of track from beach access at San Clemente Beach. This project would provide beach access without interference with train operations, resulting in train speeds to 110 mph. The additional benefits of this project would be improved operational reliability, reduced trip times, increased capacity and increased public safety.

*San Clemente Beach to CP Songs Second Main Track (PS-64):* This improvement project would construct a 3.10-mile-long second main track between San Clemente Beach and CP Songs, from MP 206.20 to MP 209.30. The second main track would be constructed to FRA Class 5 standards for a maximum speed for passenger trains of 90 mph. This project would also realign 0.80 mile of curved track south of the Orange County/San Diego County line, between MP 208.20 and MP 209.00, to increase train speed to 110 mph. The project would construct 0.45 mile of concrete viaduct. The benefits of this project would be improved operational reliability, reduced trip times and increased capacity.

*Del Mar Tunnel (PS-65):* This improvement project is located 18 miles south of Oceanside. This project would construct a new 2.12-mile-long double-track tunnel east of Del Mar Bluffs, from MP 243.90 to MP 246.00. This double-track segment would be constructed to FRA Class 5 standards for a maximum speed for passenger trains of 90 mph. The benefits of this project are improved operational reliability, reduced trip times and increased capacity.

Project PS-19, an Immediate-term environmental study of this proposed tunnel, is expected to benchmark a possible tunnel alignment that could be used to develop a realistic cost estimate for this project. Until this study is completed, the cost estimates for this project can only be regarded as very preliminary and no estimates for right-of-way acquisition, if necessary, have been considered.

*Miramar Tunnel (PS-66):* This major infrastructure project, located 15 miles north of San Diego, would construct a new double-track tunnel through Miramar, from MP 249.80 to MP 255.00, between Sorrento and Miramar. This project would construct a new 3.43-mile-long double-track tunnel and 7.98 miles of new track. The track would be constructed to FRA Class 5 standards. New bridges would be constructed at two locations.

This project would serve as a long-term solution to the Sorrento-Miramar track alignment restrictions in this environmentally sensitive area. By moving the train into a tunnel, train speed would improve. Other benefits of this project include reduced operating costs, improved operational reliability, reduced trip times, increased capacity- and public safety.

*False Bay Passing Track to CP Friar Second Main Track (PS-67):* This improvement project, located five miles north of San Diego Station, would construct a second main track, between the False Bay Passing Siding and CP Friar, 1.2 miles long, from MP 263.00 to MP 264.20. This track would be constructed to FRA Class 5 standards. One No. 20 turnout would be removed. This project would also construct five double-track concrete bridges and two grade crossings with signals. The benefits of this project would be improved capacity and operational reliability.

# Analysis Methodology

### RIDERSHIP MODELING

The increased frequencies and reduced travel times outlined in this plan would have a major impact on the market position of the Pacific Surfliner. The passenger growth outlined in this plan, accelerated by these improvements, has three major components: growth due to increased population and economic activity, induced trips and, most important, diversions from the automobile. The increased frequencies would tend to generate additional rail short-distance trips, while faster travel times would have a greater impact on the generation of long-distance trips. Both of these factors would generate additional induced trips. The overall improvement in rail service would aid in meeting the transportation needs generated by the increased traffic congestion and population growth in Southern California.

The service levels and ridership growth of the Pacific Surfliner route, combined with service levels and ridership growth for commuter rail envisioned by this plan, would represent a major change in regional and intercity transportation in Southern California. Rail transportation would become a major force in reshaping economic development in the region.

In order to focus exclusively on the impact of frequency and faster travel times, current fares were assumed. However, Amtrak's experience in the Northeast Corridor and the Pacific Northwest Corridor clearly indicates that improved services can support higher passenger yields.

### OPERATIONAL MODELING

The improvements modeled as part of the 2005 service scenario represent the optimum conditions for train operations given the infrastructure improvements that are forecast to be in place by that time. While additional modeling efforts did not continue beyond the 2008 time horizon, it is expected that train delays would continue to decrease as further improvements were developed for continued enhancement of train operations. The benefits that would be realized for the Pacific Surfliner Corridor are based on a well-defined set of infrastructure improvements that would result in capacity increases, maintenance and/or enhancement of reliability and reductions in trip time. The Pacific Surfliner Corridor's physical plant is currently strained, so it would be positively affected by these improvements that are planned to be in place by 2005.

These infrastructure improvements would represent a significant step in upgrading the physical plant in California and responding to the increased demand on California's railroads. Continued cooperation and coordination between Amtrak, the freight railroads and the commuter railroads is important in order to fully experience the benefits proposed in this plan. The growing demand on the rail infrastructure of the Pacific Surfliner Corridor requires a dynamic train scheduling process that can accommodate the projections for service modeled for this plan and the flexibility to be sensitive to future service changes by the rail operators on the corridor.

To obtain the most accurate future operations scenarios, information on planned operations was requested from all rail operators in the Pacific Surfliner Corridor. The 2005 train movements represent the assumptions at the time of the network coding. In 2005, service adjustments may need to be made based on the operations at that time to ensure reliability of all services in the Pacific Surfliner Corridor. This will continue to require ongoing coordination as other services are introduced. Certain schedule adjustments can be expected based on the necessity to integrate all operators' schedules.

Incremental benefits, such as additional capacity and increased speeds, would certainly be experienced once the related infrastructure improvement(s) are in place. Each year through 2005, Amtrak will be re-evaluating the physical plant and adjusting service improvements and schedule times until the 2005 service levels are reached. Intercity passengers would experience these incremental benefits, such as improved reliability and reductions in trip time, coincidental with the implemented improvements.

### SERVICE

Berkeley Systems RTC simulation software was used to identify reductions in trip time for the Pacific Surfliner Corridor. Detailed physical and operational attributes of the corridor were built into the model as part of the development of a fully integrated rail network for the entire state. These infrastructure characteristics were coded into the model, as described in the Pacific Surfliner Corridor Project List in this section, according to the project's associated planning horizon.

Service frequencies for this corridor were based on forecasted passenger demand. That demand calls for fourteen daily roundtrips between San Diego and Los Angeles by 2005, an increase from the eleven daily roundtrips in 2000. Of these trips, five trains would be operating through to Santa Barbara, with two extending to San Luis Obispo.

The stringline graph (Figure PS-21) represents train movements from LAUS to San Diego Station along the Pacific Surfliner Corridor. Thirty-two Amtrak trains run on this corridor over a 24-hour period. Numerous train meets occur along this busy corridor, with many of the meets occurring between LAUS and Fullerton, near Irvine, between San Clemente Pier and Stuart Mesa Yard and between Sorrento Valley and Old Town.

The simulation effort conducted as part of this study involves development of three important component

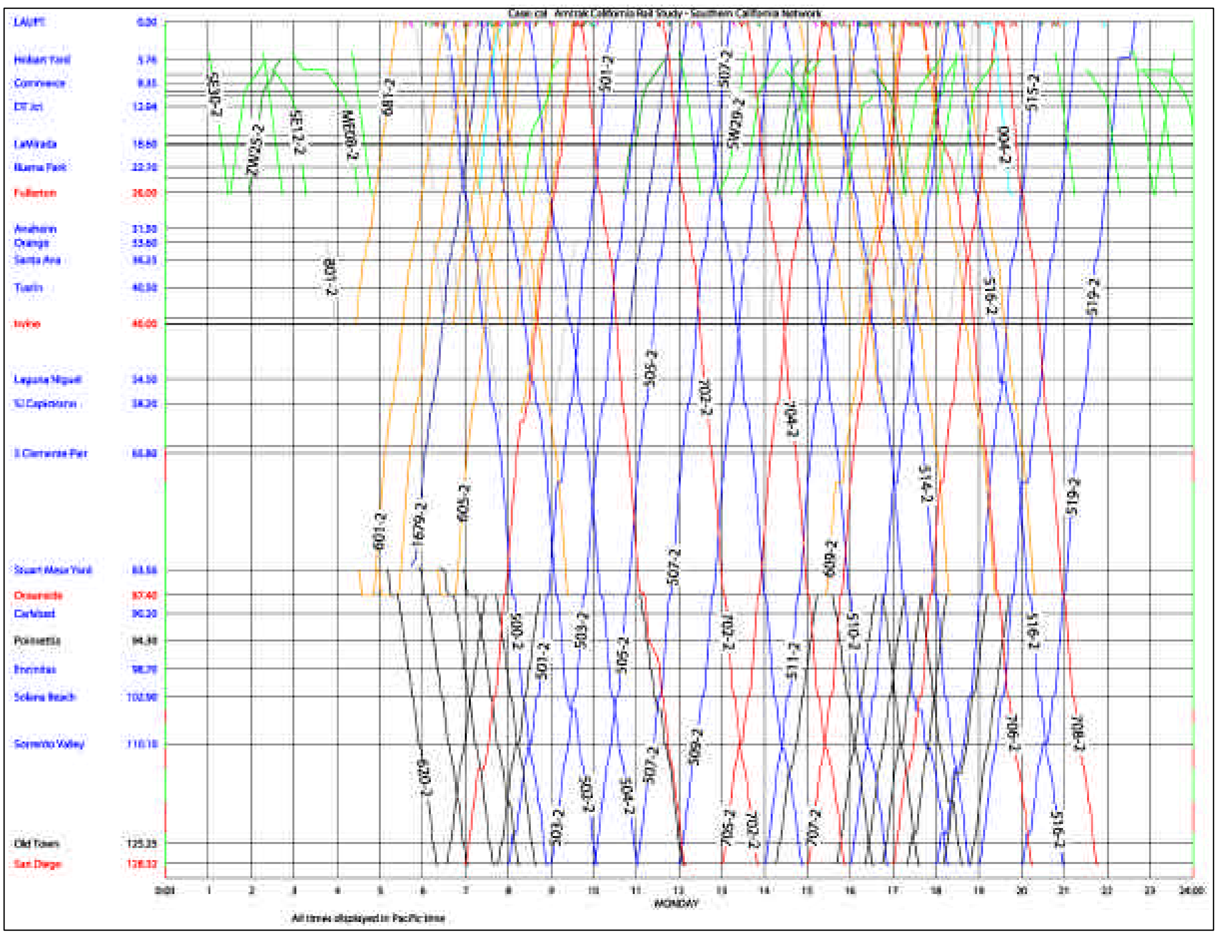



***Figure PS-21: Pacific Surfliner Corridor Stringline Diagram***

analytical results: stringline graphs, animation, and performance statistics.

Stringlines are a graphic display of the train movements in the corridor and provide a representation of train meets, in this case the trains running in the Pacific Surfliner Corridor. The stringlines vividly show whether the passenger trains would make reasonably well-timed meets with other trains in the corridor. With passenger trains considered to have priority over freight trains, passenger trains are simulated to receive the least amount of delay minutes compared with freight trains in the corridor. Resolution of train conflicts is a result of analyses based on stringline observations and dynamic animation.

Animation is an important visual tool for observing train movements in the simulation. This utility provides the modeler with the ability to determine whether the train dispatching associated with the infrastructure improvements is actually contributing to enhanced train movements. Once the stringlines were created, adjustments in the animation were made. For example, in some cases, the trains may use a track that is not the best track to occupy from an operational perspective. When this happens, the modeler has the ability to adjust the simulation to include an infrastructure characteristic that influences the train to operate along a route that would likely result from the most logical dispatching dynamics. The modeling reflects the decisions a dispatcher would make for the most effective operating scenario.

With stringlines and animation of the corridor in place, the following performance statistics were developed by train type and corridor:

- The number of trains
- The average speed of the particular train
- The total train miles
- The delay minutes per 100 train miles

These statistics were developed while evaluating service and running time goals for the Pacific Surfliner Corridor.

The trip time results of a full dispatch simulation model run for 2005 are shown in Table PS-8 below. The 2000 times are from Amtrak's 2000 timetable. The 2005 run times represent the trip times resulting from improvements implemented in a five-year time frame. The shortest times represent a trip time with minimal interference between train movements, while the longest trip times reflect dynamics such as the effects of increased freight train movements requiring passenger trains to be slowed at certain locations along the particular segment.

**Table PS-8**
**Pacific Surfliner Corridor RTC Model Run Results**

| | Actual 2000 | RTC Shortest Results | RTC Longest Results | Five-Year Plan 2005 Goal (Near-term) |
|---|---|---|---|---|
| San Diego – Los Angeles | 2 hrs., 44 min. | 2 hrs., 11 min. | 2 hrs., 27 min. | 2 hrs., 10 min. |
| Los Angeles – Santa Barbara | 2 hrs., 45 min. | 1 hrs., 57 min. | 2 hrs., 19 min. | 2 hrs., 7 min. |
| Santa Barbara – San Luis Obispo | 3 hrs., 13 min. | 2 hrs., 09 min. | 2 hrs., 10 min. | 2 hrs., 12 min. |

As evident in the simulation trip time results shown in Table PS-8, implementing the projects would provide the means by which freight trains could operate in harmony with passenger train movements over this corridor. The overall outcome is that both freight and passenger services would run reliably with minimum delays. As displayed on the stringline chart (Figure PS-21), the train movements shown indicate that the infrastructure improvements based on the Immediate-term projects plus the first two years of the Near-term projects (through 2005) would provide sufficient capacity to reliably operate the volume of trains forecasted.

## Environmental and Community Considerations

The 20-Year Improvement Plan includes construction and implementation of rail improvements within the Pacific Surfliner Corridor. Depending on funding, location, nature of construction, and related environmental impacts, it is anticipated that improvements would require environmental review in accordance with NEPA and CEQA. Appendix O, Pacific Surfliner Corridor Recommended Improvement Projects Summary, details the preliminary environmental evaluation of the proposed improvements for this corridor.

Many of the proposed Pacific Surfliner Corridor improvements may be Categorically Excluded from NEPA and/or Statutorily or Categorically Exempt from CEQA. If any improvements are found to have potentially significant adverse effects on the environment, more in-depth environmental documentation may be required.

#### LOS ANGELES TO SANTA BARBARA

Projects would be designed to minimize impacts within the corridor. Many of the proposed improvements within the segment between Los Angeles and Santa Barbara would be contained within existing right-of-way and would have minimal adverse environmental impacts. Some improvements would potentially have adverse impacts associated with widening and extending crossings at creeks and streams. Crossings would potentially impact riparian areas and sensitive biological habitats. There are also several improvements that would be within the Coastal Zone.

There would be potential direct and indirect impacts to parks and recreational facilities in Los Angeles, Ventura and Santa Barbara Counties. Direct impacts may include limited acquisition while indirect impacts include noise and visual impacts.

Several of the improvements would result in residential and commercial impacts that may affect low-income and/or minority populations. Some of the impacts to communities and schools include traffic effects during construction, increased noise levels, and visual impacts resulting from loss of vegetation. Some improvements would also result in impacts to local streets. Other potential impacts of the improvements include impacts on water quality due to erosion and storm run-off.

Improvements within this corridor segment may require coordination/permits from the California Public Utilities Commission, California Coastal Commission, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, California Department of Fish and Game, State Historic Preservation Officer, and U.S. Department of the Interior.

#### SAN DIEGO TO LOS ANGELES

Projects would be designed to minimize impacts within the corridor. Many of the proposed improvements within the segment between San Diego and Los Angeles would be contained within existing right-of-way and would have minimal adverse environmental impacts. However, some improvements would potentially have adverse impacts associated with widening and extending crossings at several rivers, streams, and lagoons, including the San Gabriel and San Dieguito Rivers and the Buena Vista, Agua Hedionda, Batiquitos and San Elijo Lagoons. Crossings would potentially impact riparian areas and sensitive biological habitats. There are also several improvements that would be within the Coastal Zone.

A specific example of this design approach is the reconstruction of the lagoon bridges in San Diego County. The existing creosote timber trestles would be replaced with longer and higher concrete bridges. The new structures would have longer spans and would require less maintenance and disruption to the fragile environment. This will help to improve the surrounding environment by increasing tidal flow and decreasing the hazardous materials/waste content associated with creosote.

There would be potential direct and indirect impacts to parks and recreational facilities in Los Angeles, Orange and San Diego Counties. Direct impacts may include limited acquisition while indirect impacts include noise and visual impacts.

Several of the improvements would require limited acquisition of residential and commercial properties that may have impacts on low-income and/or minority populations. Some improvements would also result in impacts to adjoining parallel streets. Other potential impacts of the improvements include impacts on historic properties. One of the proposed improvements, a tunnel option, would have substantial community impacts during construction.

Improvements within this corridor segment may require coordination/permits from the California Public Utilities Commission, California Coastal Commission, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, California Department of Fish and Game, State Historic Preservation Officer, U.S. Department of the Interior and the U.S. Department of Defense (Camp Pendleton).

## Results of the Plan

This planning effort used stakeholder outreach, ridership modeling tools and technical operational and engineering analysis to develop the appropriate train frequencies, travel times, operational reliability and the supporting infrastructure improvements required to meet the growing demand for service in the Pacific Surfliner Corridor.

The plan calls for hourly service between San Diego and Los Angeles with travel time of less than two hours and expanded service to Santa Barbara and San Luis Obispo. Implementing the 20-year plan would reduce the average running time between San Diego and Los Angeles by 37 percent compared to existing travel times. With the increased service and reduced trip times, annual ridership would increase from the current 1.57 million to over 5.76 million. The 20-year plan identifies $4.29 billion for infrastructure improvements, additional rolling stock and further analysis for route extensions.

### TRAIN FREQUENCY

In order to attain the service objectives of the 20-year plan, which are market-driven and based on ridership analysis, it was necessary to develop infrastructure improvements that would function as a cohesive whole rather than as a group of disjointed projects. Therefore, the customer would have reliable service at fixed, frequent and predictable intervals and, in most cases, hourly. As a result, this unified set of infrastructure improvements would allow passenger trains to offer more marketable schedules that would appeal to a broader segment of travelers.

With Amtrak, BNSF, UPRR, Metrolink and Coaster trains on the Pacific Surfliner Corridor, it is essential that the projects proposed in the 20-year plan be implemented to meet future service goals. The plan calls for three additional roundtrips running on this corridor by 2005 and two additional roundtrips by plan completion. Several Immediate projects, including new third main track from the Los Angeles to Fullerton Junction Third Main Track project (PS-06) and the Basta to Fullerton Junction Fourth Main Track (PS-07) would increase capacity and improve operational reliability on the corridor. Near-term projects, such as the track and signal upgrades from San Luis Obispo to Santa Barbara (PS-26 and PS-27), would enhance the existing infrastructure such that additional capacity is created and additional trains can be run. In addition, certain Vision projects, such as the San Clemente Beach Second Main Track (PS-63) and the Del Mar Tunnel (PS-65) would provide additional capacity for the corridor.

### TRAVEL TIME

A key component of ridership growth is travel times competitive with other modes of travel. The infrastructure improvements proposed in the 20-year plan would add enough capacity, increase speeds, reduce station dwell times and relieve critical choke-points to significantly reduce travel times. The Near-term projects would provide a significant benefit to travel times, with possible reductions of 25 to 30 minutes between San Diego and Los Angeles, 25 minutes between Los Angeles to Santa Barbara and a minimum of 30 minutes between Santa Barbara and San Luis Obispo. Additional Near-term projects that would further impact trip time include double-tracking projects along the southern portion of the corridor that would significantly reduce the conflicts currently experienced with train meets. This would effectively improve capacity and trip time with projects such as the CP Escondido Junction to CP Farr Second Main Track (PS-45) and the Torrey Pines to CP Torrey Second Main Track (PS-46). A significant improvement in regional mobility would be expected with the Immediate project to construct run-through tracks at LAUS (PS-05).

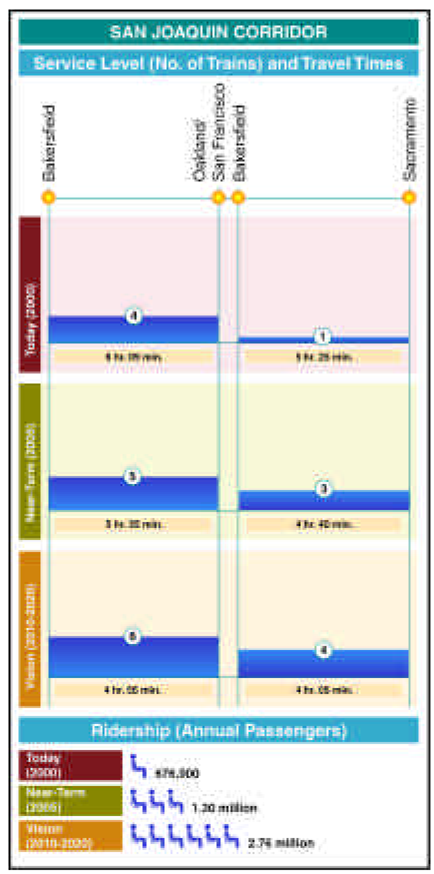
### OPERATIONAL RELIABILITY

The 20-year plan identifies a blueprint of improvements that would allow passenger and freight providers to consistently adhere to schedules and to reliably deliver the expected level of service. The limitations of the infrastructure in place require scheduling passenger trains to include excessive recovery time to compensate for these deficiencies. This is especially important along the mixed-use Pacific Surfliner Corridor, where different types and classes of trains must compete with each other for operating windows. The challenges presented by the diversity of services have hindered the development of consistent schedules within the framework of current service schedules. The investments in the 20-year plan would address and overcome these deficiencies so that schedules could be developed and reliably operated.

# SAN JOAQUIN CORRIDOR

Rail travel is a critical transportation option for the San Joaquin Valley's exploding population, which is expected to double over the next 40 years. The rail service provides an important travel option for passengers and a safe alternative for travel through the San Joaquin Valley's heavy winter fogs. Freight rail service is also integral to ensuring the efficient transportation of agricultural goods to market. The San Joaquin Corridor has through-train service between Bakersfield and both Sacramento and Oakland/San Francisco (Figure SJ-1). Direct service between Stockton and Sacramento was added in February 1999. The San Joaquin Corridor currently provides four daily roundtrips between Oakland/San Francisco and Bakersfield and one daily roundtrip between Sacramento and Bakersfield. In addition, BNSF owns the right-of-way from Bakersfield to Port Chicago and UPRR owns the right-of-way from Port Chicago to Oakland and Stockton to Sacramento. Both operate freight service on their routes.


***Figure SJ-1: San Joaquin Corridor***




## Vision: On the Right Track

Primary goals of the plan are to improve trip time and increase service to Sacramento and the Bay Area, as well as increase ridership over the entire route. The plan calls for five daily roundtrips between Bakersfield and Oakland/San Francisco, three roundtrips between Bakersfield and Sacramento, and a demonstration service to San Jose by 2005. The full build-out of the plan would yield six daily round roundtrips between Bakersfield and Oakland/San Francisco and four daily roundtrips between Bakersfield and Sacramento.

Ridership is projected to grow by 92 percent, from 676,000 to 1.30 million, in the first five years and ultimately by 300 percent by 2020, to 2.76 million riders.

When the infrastructure improvements are completed, travel times between Bakersfield and Oakland/San Francisco would be reduced by almost 20 percent, from 6 hours, 9 minutes to 4 hours, 55 minutes. Between Bakersfield and Sacramento travel times would be reduced by over 25 percent when the improvements are completed, from 5 hours, 25 minutes to approximately 4 hours.

Extended service to San Jose from Bakersfield over Altamont Pass is also envisioned under this plan to accommodate explosive residential growth in the Central Valley. If the demonstration service between Bakersfield and San Jose is successful, regular service would require capacity and operational reliability improvements to the route, as well as construction of some new track connections.

## Commuter Service: Creating Synergies

ACE operates commuter service from Stockton to San Jose over the Altamont Pass. Improvements over the Altamont Pass line in the near term would allow more commuter service between Stockton, San Jose and potentially Modesto, as well as the potential to route San Joaquin trains over the Altamont Pass to Niles Junction, where they can turn north to Oakland or south to San Jose. This would provide another option for people traveling from points throughout the Central Valley to San Jose. Trains diverted over the Altamont Pass would allow for more Capitol Corridor trains between Oakland and Martinez.

**San Joaquin Corridor Benefits**

Direct Benefits

- Increase intercity ridership by 300%
- Add 5 new roundtrips, 2 to Oakland and 3 to Sacramento
- Reduce schedules by as much as 1 hour, 20 minutes

Other Benefits

- San Jose service from Bakersfield
- ACE expansion
- Enhance freight mobility

## Freight Service: Creating Synergies

Over the next 40 years, the Valley's population is expected to double from 4.7 million to 9.9 million residents. Intercity rail passenger service would need to expand to serve the needs of this burgeoning population. Similarly, the demand will increase for efficient freight service to carry the Valley's produce and products to distant markets and to bring in essential commodities to meet an expanding population's requirements for food, consumer products, building materials and other supplies.

Recognizing the growing importance of the San Joaquin Corridor, BNSF has been an important force in improving rail service in the Valley. In recent years, BNSF has invested over $50 million in track and signal improvements and is planning over $20 million in additional improvements in the corridor. Construction of longer segments of double main line track in the Valley is critical to accommodating passenger service increases and reduced running times while handling the heavy and growing volume of freight trains. By allowing both freight and passenger trains to quickly pass slower-moving trains without stopping either train, delays can be reduced and average speeds increased.

## New Routes: Additional Opportunities for Rail Service

*Bakersfield to Los Angeles Emerging Corridor (Through Train Service to Los Angeles):* The existing freight railroad line between Bakersfield and Los Angeles over the Tehachapi Mountains is shared by both UPRR and BNSF and is the primary freight corridor between Northern and Southern California. UPRR, owner of the tracks, is currently considering freight capacity improvements on this segment of track.

Because of freight traffic and circuitous routing of the existing line, a new rail corridor would be required to implement passenger service between Bakersfield and Los Angeles. The CA HSRA is considering developing a new passenger corridor between Bakersfield and Los Angeles.

*Sacramento to Redding Emerging Corridor:* An increasing number of people are traveling to the Sacramento area from outlying communities. Redding is one example of such a community.

The "Northern Sacramento Valley Intercity Passenger Rail Study, Interim Findings Report," dated December 1995, studied intercity passenger rail service from Sacramento to Redding. The Butte County Association of Governments conducted this study. The study, which does not set forth any recommendations, presents several options for commuter and intercity passenger rail service in the Northern Sacramento Valley. Amtrak, Caltrans and SJVRC are currently investigating the potential for expanding service north to Redding.

## Existing San Joaquin Corridor Conditions

The San Joaquin Corridor is a 365-mile-long route over two freight railroad territories: BNSF line from Bakersfield to Port Chicago and UPRR line from Port Chicago to Oakland and from Stockton through Lodi to Sacramento.

The San Joaquin and Capitol Corridors overlap between Oakland and Martinez. The existing conditions for the overlapping portion of the corridors between Oakland and Martinez are described in the Capitol Corridor section of this report.

The San Joaquin Corridor is comprised of six railroad subdivisions. These subdivisions are the BNSF Stockton Subdivision, BNSF Bakersfield Subdivision, UPRR Tracy Subdivision, UPRR Martinez Subdivision, UPRR Niles Subdivision and UPRR Fresno Subdivision.

The existing conditions of the San Joaquin Corridor infrastructure are briefly described below. A more detailed description of the existing conditions can be found in Appendix D – San Joaquin Corridor Existing Physical Conditions Report.

#### DESCRIPTION OF SUBDIVISIONS

The 274-mile section of the San Joaquin Corridor on BNSF track from Bakersfield to Port Chicago is single track with a total of 26.10 miles of double track divided among five segments. These five double-track segments are located at Bakersfield (MP 885.20 – MP 892.50), Calwa (MP 994.90 – MP 998.10), Modesto (MP 1078.10 – MP 1090.80), Holt (MP 1128.80 – MP 1133.60) and Bixler (MP 1139.40 – MP 1146.30).

Sidings within the single-track segments from Bakersfield to Port Chicago are shown in Table SJ-1.

**Table SJ-1**
**Sidings on Single Track Segments**

| Station | Start Milepost | End Milepost |
|---|---|---|
| Una | 896.80 | 898.70 |
| Shafter (1) | 902.70 | 903.90 |
| Shafter (2) | 903.90 | 905.10 |
| Wasco | 911.00 | 912.40 |
| Elmo | 918.20 | 920.10 |
| Sandrini | 923.70 | 925.60 |
| Allensworth | 931.40 | 933.20 |
| Angiola | 940.90 | 942.80 |
| Corcoran | 949.90 | 951.10 |
| Corcoran | 951.10 | 953.10 |
| Guernsey | 959.30 | 961.20 |
| Hanford (1) | 965.60 | 967.60 |
| Hanford (2) | 967.80 | 968.70 |
| Shirley | 972.30 | 974.20 |
| Conejo | 981.30 | 983.20 |
| Bowles | 987.30 | 989.20 |
| Figarden | 1004.10 | 1005.90 |

| Station | Start Milepost | End Milepost |
|---|---|---|
| Gregg | 1010.40 | 1012.20 |
| Madera | 1018.00 | 1019.80 |
| Kismet | 1024.40 | 1026.30 |
| Sharon | 1029.70 | 1032.60 |
| Le Grand | 1039.90 | 1041.80 |
| Planada | 1046.40 | 1048.40 |
| Merced | 1054.30 | 1056.40 |
| Fluhr | 1062.00 | 1063.90 |
| Ballico | 1070.70 | 1072.60 |
| Denair | 1079.10 | 1081.00 |
| Riverbank | 1094.50 | 1096.10 |
| Escalon | 1101.00 | 1102.80 |
| Duffy | 1108.70 | 1110.60 |
| Walnut | 1116.10 | 1117.60 |
| Stockton | 1120.80 | 1122.10 |
| Sando | 1149.80 | 1150.90 |
| Pittsburg | 1155.80 | 1157.00 |

From Bakersfield to Port Chicago the track structure includes 148 miles of 136-lb. CWR, 35 miles of 132-lb. CWR, 19 miles of 131-lb. CWR, 72 miles of 119-lb. CWR and small amounts of 112-lb. and 115-lb. CWR. The ties are primarily timber, with approximately 8.50 total miles of concrete ties located at Knightsen, Bixler and Holt.

The 50-mile section of the San Joaquin Corridor on UPRR track from Sacramento to Stockton has a total of 9.30 miles of double track divided into two segments. These two double-track segments are located at Stockton (MP 80.00 – MP 84.70) and Elvas (MP 38.60 – MP 43.20).

Sidings within the single-track segments from Sacramento to Stockton are located at Polk (MP 43.20 – MP 44.70), Elk Grove (MP 51.80 – MP 53.50), Need (MP 59.10 – 53.50), Acampo (MP 68.10 – 69.80) and Lodi (MP 71.90 – MP 73.30).

From Sacramento to Stockton the track structure includes 37 miles of 136-lb. CWR, 5 miles of 132-lb. CWR and 8 miles of a mixture of 131-lb., 119 lb. and 113-lb. CWR. The ties are timber.

The signal system on the San Joaquin Corridor are primarily CTC with some segments of ABS.

### STATION FACILITIES

There are 19 passenger train stations on the San Joaquin Corridor. The details of joint usage, staffing and ownership are listed in Table SJ-2.

**Table SJ-2**
**Station Facilities**

| Station | Users | Staffed | Station Ownership |
|---|---|---|---|
| Bakersfield | Amtrak | Yes | City of Bakersfield |
| Wasco | Amtrak | No | BNSF |
| Corcoran | Amtrak | No | City of Corcoran |
| Hanford | Amtrak | Yes | City of Hanford |
| Fresno | Amtrak | Yes | BNSF |
| Madera | Amtrak | No | BNSF |
| Merced | Amtrak | Yes | Caltrans |
| Denair | Amtrak | No | BNSF |
| Modesto | Amtrak | Yes | City of Modesto |
| Stockton | Amtrak | Yes | BNSF |
| Antioch-Pittsburg | Amtrak | No | City of Antioch |
| Martinez[1] | Amtrak | Yes | City of Martinez |
| Richmond | BART, Amtrak | No | UPRR |
| San Francisco Ferry Building | Amtrak | Yes | Port of San Francisco |
| Emeryville[1] | Amtrak | Yes | City of Emeryville |
| Oakland (Jack London Square)[1] | Amtrak | Yes | Port of Oakland |
| Stockton (ACE)[3] | Amtrak | No | Stockton Police |
| Lodi[2] | Amtrak | No | City of Lodi |
| Sacramento[1] | Amtrak | Yes | UPRR |

NOTES:
[1] Also served by Capitol Corridor and Amtrak long-distance trains
[2] Station not in service, pending completion of Caltrans funded trackwork
[3] Served by ACE trains

All Amtrak passenger stations have parking facilities.

### LAYOVER AND MAINTENANCE FACILITIES

Layover in Sacramento is on the station track. Layover in Bakersfield is on a station track. Maintenance facilities for Amtrak trains traveling the San Joaquin Corridor are located in Oakland.

A new Amtrak locomotive and car maintenance facility is being constructed in Oakland.

## San Joaquin Corridor Plan

The San Joaquin corridor has experienced major growth in BNSF freight traffic in recent years. To deal with this growth, BNSF has taken significant steps to improve its infrastructure and accommodate its increasing train service, while Caltrans has made significant investments to accommodate passenger rail growth. Additional improvements to the signal system and steps to increase the capacity for new intercity service are proposed in this plan which would help improve the partnership that Amtrak and Caltrans have developed with BNSF on the San Joaquin corridor.

The individual improvement projects needed on the San Joaquin Corridor for the three time frames – Immediate, Near-term and Vision – are listed in Tables SJ-4 through SJ-6, respectively, along with their estimated cost. A narrative description of each project and location maps are provided following the tables. The overall project costs for the three time frames are summarized in Table SJ-3. The San Joaquin and Capitol Corridors overlap between Oakland and Martinez.

**Table SJ-3**
**San Joaquin Corridor 2000 – 2020 Summary Projects List**

| Description | Project Cost (in millions, based on year 2000 dollars) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Project | Project Development (PE, EIR/S, CM) | Right-of-Way | Trackwork/ Structures | Stations | Signal/ Systems | Grade Crossings | Rolling Stock | **Total Cost** |
| Immediate Projects Subtotal | 97.32 | 2.02 | 369.19 | 7.12 | 97.12 | 42.43 | 40.05 | **655.25** |
| Near-term Projects Subtotal | 48.92 | 1.46 | 178.92 | 0.00 | 23.48 | 30.20 | 0.00 | **282.98** |
| Vision Projects Subtotal | 157.22 | 29.99 | 637.56 | 12.00 | 81.97 | 33.18 | 0.00 | **951.92** |
| **San Joaquin Corridor Total** | **303.46** | **33.47** | **1,185.67** | **19.12** | **202.57** | **105.81** | **40.05** | **1,890.15** |

NOTES: PE: Preliminary Engineering; EIR/S: Environmental Impact Report/Statement; CM: Construction Management

### IMMEDIATE PERIOD

The Immediate projects described below and listed in Table SJ-4 are projects identified for implementation on the San Joaquin Corridor within the next three years.

**Table SJ-4**
**San Joaquin Corridor Immediate Projects List**

| Description | | Project Cost (in millions, based on year 2000 dollars) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Project No. | Project Name | Project Development (PE, EIR/S, CM) | Right-of-Way | Track-work/ Structures | Stations | Signal/ Systems | Grade Crossings | Rolling Stock | **Total Cost** |
| SJ-01 | Oakley to Pittsburg Second Main Track and Signal Upgrades | 15.62 | 0.00 | 53.12 | 0.00 | 13.64 | 6.53 | 0.00 | **88.91** |
| SJ-02 | Stockton to Holt Second Main Track and Signal | 9.06 | 0.00 | 36.73 | 0.00 | 4.80 | 1.95 | 0.00 | **52.54** |
| SJ-03 | Stockton – New Station | 0.22 | 0.00 | 0.00 | 1.78 | 0.00 | 0.00 | 0.00 | **2.00** |
| SJ-04 | Stockton – ACE Station | 0.33 | 0.00 | 0.00 | 2.67 | 0.00 | 0.00 | 0.00 | **3.00** |
| SJ-05 | Escalon to Stockton Second Main Track | 3.45 | 0.00 | 36.03 | 0.00 | 7.35 | 6.07 | 0.00 | **52.90** |
| SJ-06 | Modesto Curve Realignment and Riverbank Second Main Track | 7.16 | 0.21 | 25.84 | 0.00 | 5.97 | 2.36 | 0.00 | **41.54** |
| SJ-07 | Merced River Curve Realignment | 1.19 | 1.21 | 5.08 | 0.00 | 0.21 | 1.60 | 0.00 | **9.29** |
| SJ-08 | Merced to Winton Second Main Track | 5.40 | 0.00 | 22.53 | 0.00 | 2.96 | 5.03 | 0.00 | **35.92** |

**Table SJ-4 (continued)**
**San Joaquin Corridor Immediate Projects List**

| Description | | Project Cost (in millions, based on year 2000 dollars) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Project No. | Project Name | Project Devel-opment (PE, EIR/S, CM) | Right-of-Way | Track-work/ Structures | Stations | Signal/ Systems | Grade Crossings | Rolling Stock | **Total Cost** |
| SJ-09 | Fresno Grade Crossings and Track Improvements and Second Main Track | 5.49 | 0.00 | 20.37 | 0.00 | 2.86 | 3.12 | 0.00 | **31.84** |
| SJ-10 | Hammond Siding | 0.22 | 0.00 | 1.49 | 0.00 | 0.20 | 0.09 | 0.00 | **2.00** |
| SJ-11 | Bowles to Calwa Second Main Track | 2.20 | 0.00 | 13.70 | 0.00 | 2.40 | 3.90 | 0.00 | **22.20** |
| SJ-12 | Hanford to Conejo Curve Realignments, Track Improvements and Second Main Track | 9.88 | 0.60 | 43.15 | 0.00 | 4.45 | 5.56 | 0.00 | **63.64** |
| SJ-13 | Shirley to Guernsey Second Main Track | 2.20 | 0.00 | 34.18 | 0.00 | 6.11 | 0.41 | 0.00 | **42.90** |
| SJ-14 | Angiola to Corcoran Second Main Track | 8.04 | 0.00 | 30.77 | 0.00 | 6.37 | 1.48 | 0.00 | **46.66** |
| SJ-15 | Jastro to Shafter Second Main Track | 7.50 | 0.00 | 25.77 | 0.00 | 6.46 | 3.08 | 0.00 | **42.81** |
| SJ-16 | Corridor-Wide Signal Upgrades | 10.00 | 0.00 | 0.00 | 0.00 | 30.10 | 0.00 | 0.00 | **40.10** |
| SJ-17 | San Jose Demonstration Service | 3.08 | 0.00 | 20.43 | 0.00 | 3.24 | 1.25 | 0.00 | **28.00** |
| SJ-18 | Rolling Stock | 4.95 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 40.05 | **45.00** |
| SJ-19 | Passenger Service Enhancements and New Route Studies | 1.33 | 0.00 | 0.00 | 2.67 | 0.00 | 0.00 | 0.00 | **4.00** |
| **Subtotal** | | **97.32** | **2.02** | **369.19** | **7.12** | **97.12** | **42.43** | **40.05** | **655.25** |

*Oakley to Pittsburg Second Main Track and Signal Upgrades (SJ-01):* This project includes the construction of a 12.11-mile-long FRA Class 5 second main track and signal system upgrades from Oakley to Pittsburg (MP 1146.08 - MP 1158.19). Other improvements include removal of the existing No. 20 turnout at MP 1146.08 in Oakley; new No. 24 universal crossovers at MP 1148.26 and MP 1152.80 for operational flexibility; yard/industry track realignment at Sando (MP 1150.30) to accommodate the second main track; a new 980-foot-long bridge at MP 1151.30 in Antioch; removal of the existing turnouts for the Planada siding; upgrade of the Planada siding to FRA Class 5 standards and realignment at MP 1153.40, MP 1154.60, and MP 1156.00; and a new No. 32.7 universal crossover at MP 1157.86.

This project would reduce congestion, improve trip times, improve operational reliability and increase corridor capacity.

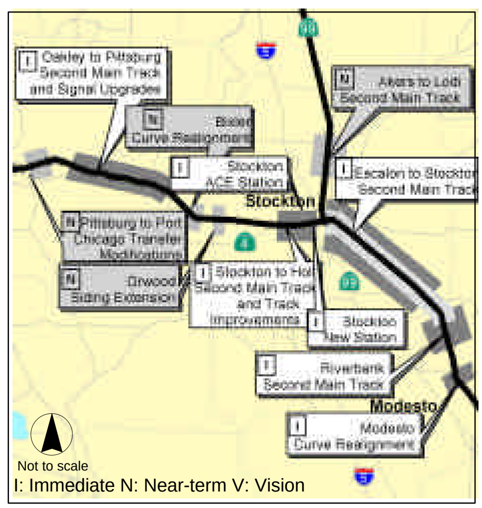


***Figure SJ-2: Pittsburg to Modesto***

*Stockton to Holt Second Main Track and Track Improvements (SJ-02):* By adding a 5.20-mile second main track, from Stockton (MP 1123.60) to Holt (MP 1128.80) and by raising the speed on the UPRR crossing (diamond) located at MP 1120.50 from 30 to 60 mph, this project would reduce congestion. The second main track would be constructed to FRA Class 5 standards for a maximum passenger train speed of 90 mph. Universal crossovers (No. 32.7) would be installed at MP 1123.60 and MP 1128.80. The Caltrans Stockton Track and Signals Improvements Project includes upgrading the UPRR diamond rail crossing (MP 1120.50) to allow 60-mph operations over the crossing.

This project would increase operational reliability, increase capacity and reduce trip times.

<u>*Stockton – New Station (SJ-03)*</u>*:* A new passenger station is planned for Stockton. Construction for the new station would include platforms and canopies, parking and station access and station and passenger service facilities.

<u>*Stockton – ACE Station (SJ-04)*</u>*:* The existing Stockton ACE station, which would serve the Sacramento to Bakersfield service, would be rehabilitated under this project.

<u>*Escalon to Stockton Second Main Track (SJ-05)*</u>*:* This project would reduce congestion, improve trip times and increase corridor capacity by constructing a 22.70-mile-long second main track from Escalon to Stockton, between MP 1100.90 and MP 1123.60.

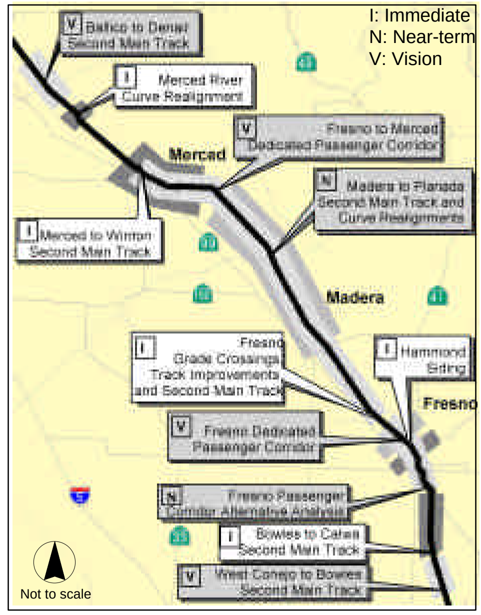



***Figure SJ-3: Modesto to Conejo***

<u>*Modesto Curve Realignment and Riverbank Second Main Track (SJ-06)*</u>*:* This improvement project would result in an increase of train speeds between MP 1087.40 and MP 1088.10 in Modesto by realigning 0.70 mile of curved track. Maximum passenger train speeds would increase from 60 to 90 mph and travel times would be improved by realigning the curve to the outside.

Also included in this project would be the construction of a 5.30-mile-long second main track north of Modesto, between Dry Creek Bridge and Riverbank (MP 1090.80 - 1096.10). This FRA Class 5 track would provide for a maximum passenger train speed of 90 mph and increased capacity. The existing turnout at MP 1090.81 would be removed and a No. 32.7 universal crossover would be installed. The turnout at Claus (MP 1092.80) would be relocated and the existing industrial tracks would be realigned. The turnout at MP 1094.50 would be removed and the existing Riverbank siding (MP 1095.60) would be upgraded to FRA Class 5 standards. A new No. 32.7 turnout would also be installed at MP 1096.08.

The speed increases above 79 mph would depend on the implementation of SJ-16.

The benefits of this project would be improved travel times and increased capacity.

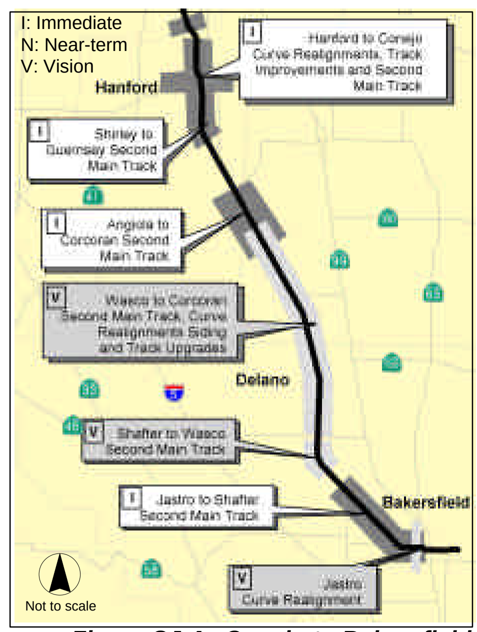



***Figure SJ-4: Conejo to Bakersfield***

<u>*Merced River Curve Realignment (SJ-07)*</u>*:* This project would eliminate sharp curves on both sides of the Merced River, approximately 13 miles north of Merced, and would result in reduced trip times by increasing the maximum passenger train operating speed through these curves from 70 to 90 mph. The speed increases above 79 mph would depend on the implementation of SJ-16. The realignment of 2.28 miles of main line track between MP 1067.99 and MP 1070.56 would reduce track curvature to one degree maximum. This project would also reduce the two-degree, four-minute curve at MP 1069.30 by realigning the track with one-degree "S" curves and tying into the tangent south of the

Merced River Bridge. In addition, this project would reduce the two-degree, three-minute curve at MP 1070.30 to a one-degree curve by realigning the curve to the inside. The alignment of the Merced River Bridge would not be affected by these curve realignments.

*Merced to Winton Second Main Track (SJ-08):* This improvement project would construct an 8.91-mile-long FRA Class 5 second main track for passing trains from Merced (MP 1058.09) northward to Winton (MP 1067.00). Also included would be construction of No. 32.7 turnouts at the ends of the second track at MP 1061.90 and MP 1063.80. The Fluhr siding would be realigned and upgraded to FRA Class 5 standards and its turnouts would be removed.

The speed increases above 79 mph would depend on the implementation of SJ-16.

The benefits of this project would be improved operational reliability, increased capacity and reduced trip time.

*Fresno Grade Crossings and Track Improvements and Second Main Track (SJ-09):* This infrastructure project would construct a 4.51-mile-long FRA Class 5 second main track, north of Fresno, 4.5 miles from Figarden, to the south side of the San Joaquin River (MP 1004.09 - MP 1008.60). No. 32.7 turnouts would be constructed at the ends of the second track at MP 1004.09 and MP 1008.60. The Figarden siding would be upgraded to FRA Class 5 standards and its turnouts would be removed. The speed increases above 79 mph would depend on the implementation of SJ-16.

This project would also make safety enhancements at eight rail/highway at-grade crossings in western Fresno, between MP 998.00 and MP 1000.00. Train speeds through the grade crossings would increase from 35 to 40 mph. These rail/highway at-grade crossing improvements and warning device additions would include flashers and gates at White (MP 999.10), Alley (MP 999.15), Harvey (MP 999.19), and Alley (MP 999.35), and gates at Lewis (MP 999.40), Tyler (MP 999.46), Clay (MP 999.52), and Hammond (MP 999.69).

This project would also make rail-crossing improvements at two locations in Fresno. Both the Calwa railroad-crossing diamond, located at MP 994.30 in Fresno, and the Sunmaid railroad-crossing diamond, located at MP 996.70 in Fresno, would be replaced with upgraded crossing diamond to increase speeds at the crossing to 50 mph.

This project would improve operational reliability, reduce congestion and reduce trip times.

*Hammond Siding (SJ-10):* This project would add capacity and operational reliability for both freight and passenger trains by adding a new 0.85-mile siding at Hammond, from MP 999.00 to MP 999.85. This siding would enhance the existing infrastructure in the Fresno area, permitting the fluid movement of both passenger and freight trains through this critical area. Improvements at Hammond are based on the premise that project SJ-09 would be implemented.

*Bowles to Calwa Second Main Track (SJ-11):* This infrastructure project constructs a 7.33-mile-long FRA Class 5 second main track, from Bowles to Calwa (MP 987.33 - MP 994.66). Other improvements of this project include crossovers at Thorpe (MP 993.00); removal of the existing turnout at East Bowles (MP 987.33) and replacement with a No. 32.7 turnout; removal of the existing turnout at MP 989.20 and replacement with a No. 20 universal crossover for operational flexibility at higher train speeds; FRA Class 5 upgrade to the Bowles siding; a second crossing diamond at the East Calwa railroad crossing (MP 994.20); and a No. 10 universal crossover at MP 994.66. The speed increases above 79 mph would depend on the implementation of SJ-16.

This project would reduce congestion, improve trip times and increase corridor capacity.

*Hanford to Conejo Curve Realignments, Track Improvements and Second Main Track (SJ-12):* This major infrastructure improvement project would increase passenger train speeds to 90 mph through three curves totaling 1.91 miles in length in Hanford and 22 miles south of Fresno (MP 973.40 - MP 976.06) by realigning the curves to one degree maximum curvature. The existing three-degree, five-minute curve at MP 973.80 restricts passenger trains to a maximum speed of 45 mph. The existing two-degree, one-minute curve at MP 975.20 and two-degree, 59-minute curve at MP 975.60 restricts passenger trains to a maximum speed of 50 mph. The curve realignment at MP 975.60 would require the construction of a 330-

foot-long bridge over the Kings River at MP 974.26, a 100-foot-long bridge at MP 975.60 and a 130-foot-long bridge at MP 975.82.

This project would also build an 11-mile-long FRA Class 5 second main track for passing trains from West Shirley to West Conejo (MP 972.38 - MP 983.38). This second main track would require construction of a 95-foot-long bridge at MP 974.26, a 60-foot-long bridge at MP 976.28 and a 50-foot-long bridge at MP 977.77. This project would also include construction of No. 32.7 turnouts at the ends of the second track at MP 972.38 and MP 983.38; relocation of storage tracks at Laton (MP 976.00) to the eastside of the main line; and replacement and upgrade of the railroad-crossing diamond located at MP 967.70 in Hanford to increase speeds from 30 to 50 mph.

The speed increases above 79 mph would depend on the implementation of SJ-16.

This project would improve operational reliability, increase capacity and reduce trip time.

*Shirley to Guernsey Second Main Track (SJ-13):* By constructing a 14.84-mile-long second main track, from Shirley to Guernsey (MP 974.18 - MP 959.34), this project would reduce congestion, improve trip times and increase corridor capacity. This new second track would utilize portions of existing sidings and freight tracks.

*Angiola to Corcoran Second Main Track (SJ-14):* This project, which is located midway between Fresno and Bakersfield, would construct a 9.6-mile-long FRA Class 5 second main track from Angiola to Corcoran (MP 940.90 - MP 950.50). Existing turnouts (MP 940.96 and 942.40) for the Angiola siding would be removed and a No. 32.7 turnout installed at MP 940.96. This project would also include upgrading the Angiola siding to FRA Class 5 standards and relocation to 25-foot track centers. The existing turnout at MP 949.90 in Corcoran would be removed and a No 32.7 crossover would be installed at MP 950.40. The track between MP 949.90 and 950.50 would be upgraded to FRA Class 5 standards.

The speed increases above 79 mph would depend on the implementation of SJ-16.

This project would reduce congestion, improve trip times and increase corridor capacity.

*Jastro to Shafter Second Main Track (SJ-15):* This infrastructure project, located four miles north of Bakersfield, would construct a 11.43-mile-long FRA Class 5 second main track from Jastro to the east side of Shafter (MP 892.23 - MP 903.66). This project would remove the existing turnout at Jastro (MP 892.23) and would replace it with a No. 24 universal crossover. The existing No. 20 turnouts (MP 896.80 and MP 898.60) for the Una siding would also be removed. The Una siding would be relocated to 25-foot track centers and would be upgraded to FRA Class 5 standards. A No. 32.7 universal crossover would be installed at MP 898.25 to allow greater operational flexibility at higher train speeds. A No. 32.7 turnout would be installed at the end of the project at MP 903.66.

The speed increases above 79 mph would depend on the implementation of SJ-16.

This project would reduce congestion and delays, while adding much needed capacity to the corridor.

*Corridor-Wide Signal Upgrades (SJ-16):* This project would improve trip times along the San Joaquin Corridor by increasing train speeds up to 90 mph through supplemental signal upgrades. Some signal improvement costs are included as part of the second main track projects, above. The combined projects would provide for 90-mph service and 52 miles of second main track.

*San Jose Demonstration Service (SJ-17):* This project would include rolling stock and initial startup costs for a demonstration service between Bakersfield and San Jose over the Altamont Pass.

*Rolling Stock (SJ-18):* This project would purchase three modern trainsets (with locomotives) to operate the proposed additional frequencies.

*Passenger Service Enhancements and New Route Studies (SJ-19):* This project would improve customer satisfaction by installing new ticket vending machines, message boards, and automated fare collection systems. In addition, a comprehensive route study including preliminary engineering and ridership analysis would be conducted to determine the feasibility of providing passenger rail service from Sacramento to Redding.

## NEAR-TERM PERIOD

Near-term projects for the San Joaquin Corridor, listed in Table SJ-5, have been identified and recommended to achieve the four- to eight-year service goals for the corridor, while making a significant investment towards the goals of the 20-year vision for the corridor.

**Table SJ-5**
**San Joaquin Corridor Near-Term Projects List**

| Description | | Project Cost (in millions, based on year 2000 dollars) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Project No. | Project Name | Project Devel-opment (PE, EIR/S, CM) | Right-of-Way | Trackwork/ Structures | Stations | Signal/ Systems | Grade Crossings | Rolling Stock | **Total Cost** |
| SJ-20 | Pittsburg to Port Chicago Transfer Modifications | 1.67 | 0.00 | 7.03 | 0.00 | 2.34 | 1.41 | 0.00 | **12.45** |
| SJ-21 | Bixler Curve Realignment | 2.19 | 0.75 | 8.72 | 0.00 | 0.25 | 0.63 | 0.00 | **12.54** |
| SJ-22 | Orwood Siding Extension | 2.53 | 0.00 | 9.41 | 0.00 | 2.46 | 0.00 | 0.00 | **14.40** |
| SJ-23 | Akers to Lodi Second Main Track | 5.95 | 0.00 | 24.38 | 0.00 | 2.50 | 1.67 | 0.00 | **34.50** |
| SJ-24 | Madera to Planada Second Main Track and Curve Realignments | 23.48 | 0.71 | 90.36 | 0.00 | 9.34 | 11.77 | 0.00 | **135.66** |
| SJ-25 | Fresno Passenger Corridor Alternative Analysis | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **2.00** |
| SJ-26 | Altamont Emerging Corridor Niles Canyon Track Improvements | 0.56 | 0.00 | 2.82 | 0.00 | 0.00 | 0.00 | 0.00 | **3.38** |
| SJ-27 | Altamont Emerging Corridor Livermore to Pleasanton Second Main Track and Existing Sidings Upgrades | 3.63 | 0.00 | 15.95 | 0.00 | 0.85 | 1.41 | 0.00 | **21.84** |
| SJ-28 | Altamont Emerging Corridor Altamont Pass Track Improvements and Existing Midway Siding Extension | 1.31 | 0.00 | 5.68 | 0.00 | 0.81 | 0.01 | 0.00 | **7.81** |
| SJ-29 | Altamont Emerging Corridor Stockton to Lathrop to Tracy Track Alignment, Siding Extension and Curve Realignment | 4.06 | 0.00 | 14.57 | 0.00 | 4.93 | 0.84 | 0.00 | **24.40** |
| SJ-30 | Safety and Mobility Enhancements | 1.54 | 0.00 | 0.00 | 0.00 | 0.00 | 12.46 | 0.00 | **14.00** |
| **Subtotal** | | **48.92** | **1.46** | **178.92** | **0.00** | **23.48** | **30.20** | **0.00** | **282.98** |

*Pittsburg to Port Chicago Transfer Modifications (SJ-20):* This project, located two miles west of Pittsburg, would construct a new 4,460-foot-long FRA Class 5 connecting track between the BNSF and UPRR Tracy Subdivision, from MP 1158.19 to UPRR MP 45.65. A turnout would also be installed at UPRR MP 45.65. Other improvements would include upgrading the UPRR's industry lead track with new CWR and ties (MP 45.65 - MP 41.03) to provide a FRA Class 5 second main track. This project would connect to Caltrans' and Amtrak's Martinez-Port Chicago Track and Signal Improvements Project scheduled for completion in 2001.

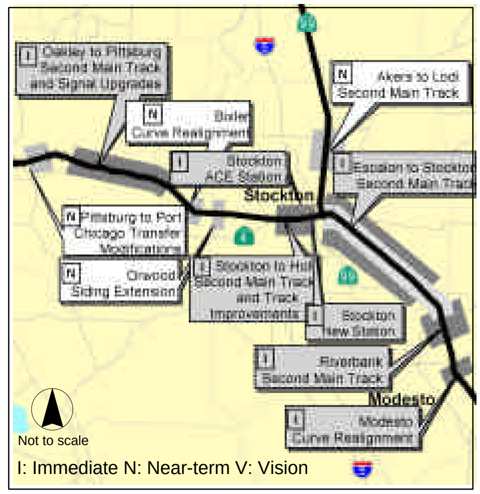


*Figure SJ-5: Pittsburg to Modesto*

*Bixler Curve Realignment (SJ-21):* This project would reduce trip times by increasing the maximum allowable passenger train speeds on the curve from 60 to 90 mph. Located approximately 12 miles south of Antioch, this project would realign 0.9 mile of main line track at Bixler (MP 1139.90 - MP 1140.20) to reduce the maximum track curvature from three degrees, five minutes to one degree.

*Orwood Siding Extension (SJ-22):* This project, located 15 miles north of Stockton (MP 1136.43 - MP 1139.21), would reconstruct 0.80 mile of the existing Orwood siding track and extend the siding 2.00 miles northward. The Orwood siding reconstruction and extension would be to FRA Class 5 standards for a maximum speed for passenger trains of 90 mph. This project would also remove the existing Orwood siding turnouts and add a No. 20 turnout at MP 1136.43.

*Figure SJ-6: Modesto to Conejo*

*Akers to Lodi Second Main Track (SJ-23):* This infrastructure project, located five miles north of Stockton, would construct 5.90 miles of FRA Class 5 second main track from Akers to Lodi (UPRR MP 80.00 - MP 74.10). The existing equilateral crossover at MP 80.00 would be removed and the track would be realigned. Other improvements would include construction of a second main line track on the west side of the UPRR track, from MP 80.00 to MP 76.80 (which would connect to the existing main line at MP 76.80). Caltrans' Sacramento to Stockton Track and Signals Improvements Project is currently constructing a new siding at Tomspur (MP 76.38 - MP 74.60) and extending the existing Lodi siding (MP 74.40 - MP 73.26). Because these sidings would be constructed to FRA Class 5 standards and would be east of the main line, they would be used to form the new second track sections of this project. The existing turnout at MP 76.80 would be removed, the track would be realigned and a No. 24 universal crossover would be installed. The turnouts on the new Tomspur and Lodi sidings would be removed and the sidings would be connected to complete the 5.90-mile second main track.

This project would improve operational reliability, increase train speeds and increase capacity between Akers and Lodi.

*Madera to Planada Second Main Track and Curve Realignments (SJ-24):* This project would include second main track and curve realignment improvements that would increase speeds and capacity and improve operational reliability between Madera and Planada. Improvements would include constructing 27.50 miles of new FRA Class 5 second main track north of Fresno from Madera (MP 1021.00) to east of Planada (MP 1048.49). This second main track would be constructed west of the existing BNSF main line track. At MP 1021.00, a No. 32.7 turnout would be installed and No. 32.7 universal crossovers would be installed at MP 1027.90 and MP 1037.91. A No. 32.7 turnout would also be installed at the Planada end of the second main track (MP 1048.49). The existing Planada siding, which would be incorporated into the second main track, would be realigned to 25-foot track centers and upgraded to FRA Class 5 standards.

This project would also increase the maximum passenger train speed from 70 to 90 mph between MP 1047.13 and MP 1048.14 by realigning the 1.01-mile-long (two-degrees, three-minutes) curve.

*Fresno Passenger Corridor Alternative Analysis (SJ-25):* This analysis would begin the process of building a passenger-only track adjacent to the UPRR line through Fresno, from Calwa to Biola, with a flyover back to the BNSF line at Gregg. This alignment would be farther from residential areas in the city and could be used as an alternative route through the city for freight trains at night. The existing Amtrak station would be replaced with a new station located on the UPRR right-of-way.

*Altamont Emerging Corridor Niles Canyon Track Improvements (SJ-26):* This project would improve trip times by upgrading 9.00 miles of existing track through Niles Canyon (MP 31.00 - MP 40.00). This would be done by improving the superelevation on existing curves and repairing drainage problems in the 4,200-foot-long tunnel between MP 32.12 and MP 32.94.

*Altamont Emerging Corridor Livermore to Pleasanton Second Main Track and Existing Sidings Upgrades (SJ-27):* By upgrading two existing sidings MP 43.08 and at MP 47.50 to main line standards and connecting them with new FRA Class 5 track, this project would provide 4.42 miles of additional double main line. Also included in the scope of this project would the upgrade of warning signals at two Radum road crossings and the use of the ACE station at Livermore as an Amtrak stop.

*Altamont Emerging Corridor Altamont Pass Track Improvements and Existing Midway Siding Extension (SJ-28):* This project would improve operational reliability, increase train speeds, and increase capacity through the Altamont Pass by upgrading 15.50 miles of existing track, from MP 51.50 to MP 67.00. This project would include improvements to superelevation on the existing curves; repairing geotechnical problems at MP 52.60; and extension of the existing Midway siding 3,500 feet eastward, from MP 63.80 to MP 64.50.

*Altamont Emerging Corridor Stockton to Lathrop to Tracy Track Alignment, Siding Extension and Curve Realignment (SJ-29):* This major infrastructure project would allow an Amtrak San Joaquin train to run from the Altamont Pass to San Jose and would increase ACE service along the same route. This project would realign the curve at BNSF MP 1120.50 on the BNSF/UPRR connection track; add a new runaround track on the UPRR line at Lathrop to bypass UPRR switching operations at the Lathrop Intermodal Yard; upgrade the crossing (diamond) at UPRR MP 74.06 to increase speeds across the crossings to 50 mph; and extend the existing Carbona siding 8,000 feet westward through the Tracy Station (UPRR MP 70.20 - MP 71.70).

This project would improve operational reliability, increase train speeds and increase capacity between Stockton, Lathrop and Tracy.

*Safety and Mobility Enhancements (SJ-30):* This project would identify specific roadway/railroad intersection improvements to improve rail/highway grade crossing safety and reduce traffic congestion on local streets as frequencies and speeds are increased along the San Joaquin Corridor. Improvements would include roadway approach and widening improvements, warning system upgrades and crossing closures.

### VISION

Vision projects listed in Table SJ-6 and described below are those projects, that would be implemented over a nine- to twenty-year period to meet the twenty-year service and trip time goals for the San Joaquin Corridor.

## Table SJ-6
## San Joaquin Corridor Vision Projects List

| Description | | Project Cost (in millions, based on year 2000 dollars) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Project No. | Project Name | Project Development (PE, EIR/S, CM) | Right-of-Way | Track-work/ Structures | Stations | Signal/ Systems | Grade Crossings | Rolling Stock | **Total Cost** |
| SJ-31 | Ballico to Denair Second Main Track | 5.00 | 0.00 | 15.00 | 0.00 | 3.00 | 2.00 | 0.00 | **25.00** |
| SJ-32 | Fresno to Merced Dedicated Passenger Corridor | 66.27 | 0.00 | 265.12 | 8.00 | 49.71 | 16.57 | 0.00 | **405.67** |
| SJ-33 | Fresno Dedicated Passenger Corridor | 45.06 | 7.59 | 207.14 | 4.00 | 10.65 | 9.36 | 0.00 | **283.80** |
| SJ-34 | West Conejo to Bowles Second Main Track | 5.70 | 0.00 | 21.79 | 0.00 | 4.11 | 1.50 | 0.00 | **33.10** |
| SJ-35 | Wasco to Corcoran Second Main Track, Curves Realignments, Sidings and Track Upgrades | 24.70 | 0.00 | 104.10 | 0.00 | 12.00 | 2.50 | 0.00 | **143.30** |
| SJ-36 | Shafter to Wasco Second Main Track | 4.40 | 0.00 | 18.30 | 0.00 | 2.00 | 1.00 | 0.00 | **25.70** |
| SJ-37 | Jastro Curve Realignment | 6.09 | 22.40 | 6.11 | 0.00 | 0.50 | 0.25 | 0.00 | **35.35** |
| **Subtotal** | | **157.22** | **29.99** | **637.56** | **12.00** | **81.97** | **33.18** | **0.00** | **951.92** |

*Ballico to Denair Second Main Track (SJ-31):* This project, located 19 miles north of Merced, would include construction of an 8.10-mile-long FRA Class 6 second main track, from Ballico to Denair (MP 1070.70 - MP 1078.80), for passenger train operations only. This project would also upgrade the existing rail/highway grade crossings to increase safety, operational reliability, and capacity and to reduce trip times between Ballico and Denair.

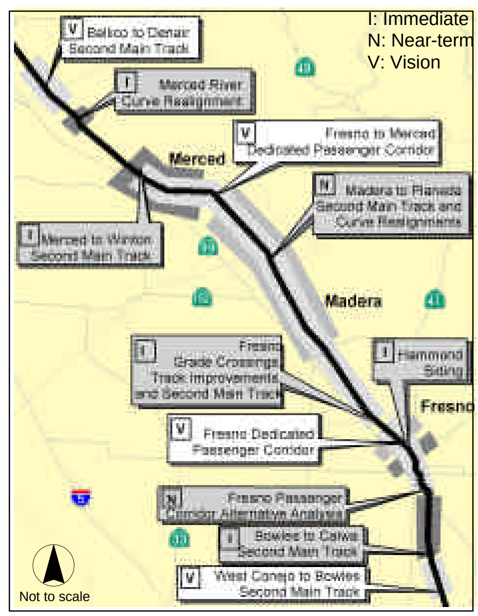


***Figure SJ-7: Modesto to Conejo***

*Fresno to Merced Dedicated Passenger Corridor (SJ-32):* This major infrastructure project would construct a dedicated passenger-only track adjacent to the UPRR line from Fresno to Merced, with a flyover back to the BNSF line at North Merced. The new track alignment would connect to the Fresno Passenger Corridor near Biola (see project SJ-33). A 44.00-mile-long dedicated FRA Class 6 track, for 110-mph passenger-operation, would be constructed west of the UPRR tracks, from UPRR MP 193.80 to MP 149.80, where the alignment would flyover the UPRR track and connect to existing UPRR tracks in Merced. This project would also upgrade the existing rail/highway grade crossings along this section of track. A 3.50-mile-long double-track alignment would connect UPRR to BNSF. The existing Madera and Merced Amtrak Stations would be replaced with new stations located on the UPRR right-of-way. Also included in this project are two passing sidings, from MP 191.00 to MP 194.00 and from MP 164.000 to MP 167.00.

This project would increase operational reliability and reduce trip times.

<u>Fresno Dedicated Passenger Corridor (SJ-33)</u>: This major infrastructure project would construct a dedicated FRA Class 6, 110-mph, passenger-only track adjacent to the UPRR line through Fresno, from Calwa to Biola, with a flyover back to the BNSF line at Gregg. The new track alignment would connect to the UPRR right-of-way south of Calwa.

A connection would be constructed from south of the Calwa crossing (BNSF MP 993.95) on the BNSF right-of-way to UPRR MP 209.05 on the UPRR right-of-way. A portion of Golden State Boulevard Overpass would be reconstructed. Other improvements in this area include a new No. 20 turnout at BNSF MP 994.01 on the BNSF track. Seven acres of right-of-way would also be acquired.

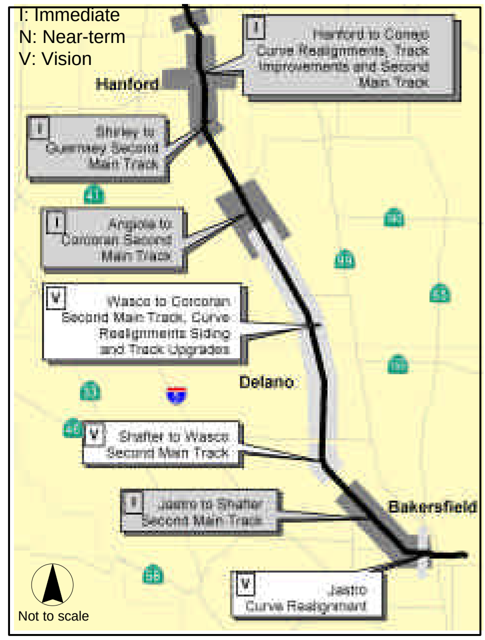



*Figure SJ-8: Conejo to Bakersfield*

A 14.66-mile FRA Class 6 dedicated passenger main track would be constructed west side of the UPRR tracks within the right-of-way, from MP 209.05 to MP 194.39, where the alignment would flyover the UPRR track. Within this section, a new No. 10 universal crossover and turnout would be installed at MP 204.40 to allow connections to the San Joaquin Valley Railroad branchline and local industry tracks. A new No. 10 crossover at MP 203.90 andMP 203.81 would be installed to allow connections to local industry tracks. This project would also upgrade the existing rail/highway grade crossings along this section of track.

A 4.35-mile-long FRA Class 5 double track connection would be constructed from the UPRR tracks at Biola to the BNSF tracks at Gregg (UPRR MP 194.39 - BNSF MP 1013.43). Other improvements within this section include a new No. 32.7 turnout at BNSF MP 1013.43, a 540-foot-long flyover to the UPRR tracks; and a 940-foot-long bridge over the San Joaquin River. Approximately 76.30 acres of right-of-way would also be acquired.

The existing Fresno Station would be rebuilt with a new station located between Tulare Street and Fresno Street (UP MP 204.55) in the UPRR corridor.

This project would increase operational reliability and reduce trip times.

<u>West Conejo to Bowles Second Main Track (SJ-34)</u>: This infrastructure improvement project, located 13 miles south of Fresno, would construct a 4.20-mile-long FRA Class 6 passenger-only second main track from West Conejo to Bowles (MP 983.20 - MP 987.40). This project would also upgrade the existing rail/highway grade crossings along this section of track.

This project would increase operational reliability, increase capacity and reduce trip times.

<u>Wasco to Corcoran Second Main Track, Curves Realignments, Sidings and Track Upgrades (SJ-35)</u>: This project, located between Hanford and Bakersfield, would construct a 26.30-mile-long FRA Class 6 passenger-only second main track from Wasco to Angiola (MP 914.30 - MP 940.60). This project would also upgrade the existing grade crossings along this section of track and realign two existing curves, from MP 921.30 to MP 921.50 and from MP 930.90 to MP 931.10, to reduce the maximum curvature to one degree. Track No. 1 would also be upgraded to FRA Class 6 track standards between MP 940.90 and MP 950.50, and would be converted to passenger-only operations. Two sidings, from MP 936.80 to MP 938.60 and from MP 942.60 to MP 945.60, would be also constructed.

This project would increase operational reliability, increase capacity and reduce trip times.

<u>Shafter to Wasco Second Main Track (SJ-36)</u>: This project, 22 miles north of Bakersfield, would improve operational reliability and increase capacity between Shafter and Wasco (MP 906.50 - MP 911.40), by constructing a 4.90-mile-long FRA Class 6 second main track with rail/highway grade crossing improvements.

*Jastro Curve Realignment (SJ-37):* This project, located five miles north of Bakersfield, would reduce the maximum track curvature to one degree by realigning 1.00 mile of main line track at Jastro (MP 892.60 - MP 893.60). This project would improve trip times and increase capacity by raising train speeds to 79 mph.

# Analysis Methodology

### RIDERSHIP MODELING

The increased frequencies and reduced travel times outlined in this plan would have a major impact on the market position of the San Joaquin Corridor. The passenger growth outlined in this plan, accelerated by these improvements, has three major components growth due to increased population and economic activity, induced trips and, most important, diversions from the automobile. The increased frequencies would tend to generate additional rail short-distance trips, while faster travel times would have a greater impact on the generation of long-distance trips. Both of these factors would generate additional induced trips. The overall improvement in rail service would aid in meeting the transportation needs generated by the increased traffic congestion and population growth in the San Joaquin Valley.

The improved frequencies and reduced travel times would aid in making the historic downtowns in San Joaquin Valley cities more attractive. With easy access to other cities in the Valley, Sacramento and the Bay Area, these downtowns could be the focus of forecasted population growth in the San Joaquin Valley.

In order to focus exclusively on the impact of frequency and faster travel times, current fares were assumed. However, Amtrak's experience in the Northeast Corridor and the Pacific Northwest Corridor clearly indicates that improved services can support higher passenger yields.

### OPERATIONAL MODELING

The network model for the 2005 service scenario represents the typical conditions for train operations given the infrastructure improvements that are forecast to be in place by that time. While additional modeling efforts did not continue beyond the 2008 time horizon, it is expected that train delays would continue to decrease as further improvements are developed for continued enhancement of train operations. The benefits that would be realized for the San Joaquin Corridor are based on a well-defined set of infrastructure improvements resulting in increased capacity, reduced maintenance costs and/or enhanced reliability and reduced trip time.

These infrastructure improvements would represent a significant step in upgrading the physical plant in Central California and responding to the increased demand on California's passenger and freight railroads. Continued cooperation and coordination between Amtrak, freight railroads and the commuter railroads are important in order to fully experience the benefits proposed in this plan. The growing demand on the rail infrastructure of the San Joaquin Corridor requires a dynamic train scheduling process that considers the projections for service as modeled for this plan along with the flexibility to be sensitive to future service changes from the various rail operators on the corridor.

To obtain the most accurate future operations scenarios, information on planned operations was requested from all rail operators in the San Joaquin Corridor. In 2005, service adjustments would need to be made based on current operations to ensure reliability of all services in the San Joaquin Corridor. This process will continue to require ongoing coordination as other services are introduced. Certain schedule adjustments can be expected based on the necessity to integrate all operators' schedules.

Incremental benefits such as additional capacity and increased speeds would certainly accrue once the related infrastructure improvements are in place. Each year through 2005, Amtrak and its partners will be reevaluating the physical plant and adjusting service improvements and schedule times until the 2005 service levels are reached. Passengers would experience these incremental benefits, such as improved reliability and reduced trip time, as the projects are implemented.

#### Service

Berkeley Systems RTC simulation software was used to identify reductions in trip time for the San Joaquin Corridor. Detailed physical and operational attributes of the corridor were built into the model as part of the development of a fully integrated rail network for the entire state. These infrastructure characteristics were coded into the model, as described in the San Joaquin Corridor Project List in this section, according to the project's associated planning horizon.

Service frequencies for this corridor were based on forecasted passenger demand. That demand calls for five daily roundtrips between Bakersfield and Oakland/San Francisco by 2005, an increase from four daily roundtrips in 2000. The demand also calls for three daily roundtrips between Bakersfield and Sacramento, an increase from the one daily roundtrip in 2000. In addition, one peak demonstration train between Modesto and San Jose was modeled for the 2005 case.

The stringline graph (Figure SJ-9) represents train movements from Bakersfield to Jack London Station in Oakland along the San Joaquin Corridor. Nineteen meets would occur between Shafter and Sandrini. Additional train meets occur throughout the day at or near Fresno and between Martinez and Jack London.

The simulation effort conducted as part of this study involves development of three important component results: stringline graphs, animation and performance statistics.

Stringlines visually represent the train movements in the corridor and provide a representation of train meets, in this case the trains running in the San Joaquin Corridor. The stringlines vividly show whether the passenger trains would make reasonably well-timed meets with other trains in the corridor. With passenger trains considered to have priority over freight trains, passenger trains are simulated to receive the least amount of delay minutes compared with freight trains in the corridor. Resolution of train conflicts takes place based on stringline observations and animation.

Animation is an important visual tool for observing train movements in the simulation. This utility provides the modeler with the ability to determine whether the train dispatching associated with the infrastructure

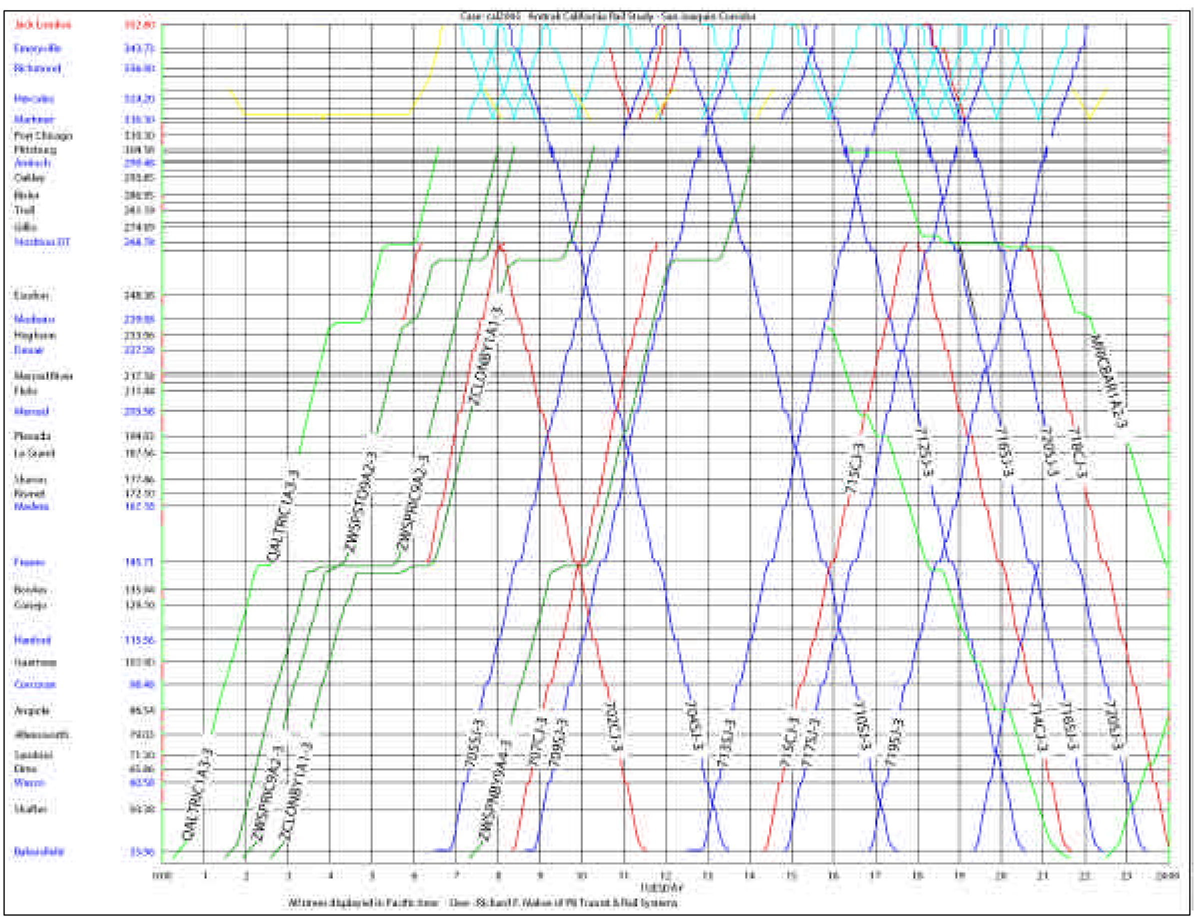


***Figure SJ-9: San Joaquin Corridor Stringline Diagram***

improvements is actually contributing to enhanced train movements. Once the stringlines were created, adjustments in the animation were made. For example, in some cases, the trains may use a track that is not the best track to occupy from an operational perspective. When this happens, the modeler has the ability to adjust the simulation to include an infrastructure characteristic that influences the train to operate along a route that would likely result from the most logical dispatching dynamics. The modeling reflects the decisions a dispatcher would make for the most effective operating scenario.

With stringlines and animation of the corridor in place, the following performance statistics were developed by train type and corridor:

- The number of trains
- The average speed of the particular train
- The total train miles
- The delay minutes per 100 train miles

These statistics were developed while evaluating service and running time goals for the San Joaquin Corridor.

The trip time results of a full dispatch simulation model run for 2005 are shown in Table SJ-7. The 2000 times are from Amtrak's 2000 timetable. The 2005 run times represent the trip times resulting from improvements implemented in a five-year time frame. The shortest times represent a trip time with minimal interference between train movements, while the longest trip times reflect dynamics such as the effects of increased freight train movements requiring passenger trains to be slowed at certain locations along the particular segment.

**Table SJ-7**
**San Joaquin Corridor RTC Model Run Results**

| | Actual 2000 | RTC Shortest Results | RTC Longest Results | Five-Year Plan 2005 Goal (Near-term) |
|---|---|---|---|---|
| Bakersfield - Oakland | 6 hrs., 9 min. | 4 hrs., 58 min. | 5 hrs., 18 min. | 5 hrs., 35 min. |
| Bakersfield - Sacramento | 5 hrs., 25 min. | 4 hrs., 15 min. | 4 hrs., 25 min. | 4 hrs., 40 min. |
| Modesto – San Jose | -- | 2 hrs., 3 min. | 2 hrs., 13 min. | |

As evident in the simulation trip time results shown in Table SJ-7, the benefits from implementing the implementing the projects would provide the means by which freight trains could operate in harmony with passenger train movements over this corridor. The overall outcome would be that both freight and passenger services would run reliably, with minimal delays. As displayed on the stringline chart (Figure SJ-9), the train movements shown indicate that the infrastructure improvements based on the Immediate-term projects plus the first two years of the Near-term projects (through 2005) would provide sufficient capacity to reliably operate the volume of trains forecasted.

From a simulation perspective, the San Joaquin Corridor is the most straightforward because the line is primarily a single-track line with frequent siding and some limited sections of double track. The Immediate and Near-term improvements primarily involve the extension of existing second track or sidings.

A characteristic of the line is the fact that BNSF operates the majority of its freight trains at high speed along the line. Thus, the infrastructure improvements recognize that the physical plant must be robust enough to ensure that increased and improved passenger train service operates in harmony with BNSF's increasingly dense freight service.

The simulation of the San Joaquin service also required the inclusion of UPRR operations on the busy Fresno Subdivision as well as those on the Roseville Subdivision and the impacts between Martinez and

Oakland of the Capitol Corridor service. The Capitol Corridor service likewise would impact the San Joaquins at Sacramento. The simulation evaluated the operation of limited service across the Altamont Pass to San Jose from Modesto to serve new customers traveling to the Silicon Valley as well.

The depth of the improvements along this corridor is such that the service expansion to both Oakland and Sacramento could be well-accommodated throughout the corridor. The simulation confirms that the plant improvements would be adequate to support both new passenger service and the future service plan provided by BNSF.

## Environmental and Community Considerations

The 20-Year Improvement Plan includes construction and implementation of rail improvements within the San Joaquin Corridor. Depending on funding, location, nature of construction and related environmental impacts, it is anticipated that improvements would require environmental review in accordance with CEQA and/or NEPA.

Many of the proposed San Joaquin Corridor improvements may be Categorically Excluded from NEPA and/or Statutorily or Categorically Exempt from CEQA. If after further evaluation any improvements are found to have potentially significant adverse effects on the environment, more in-depth environmental documentation may be required.

Projects would be designed to minimize impacts within the corridor. Many of the proposed improvements within the San Joaquin Corridor would be contained within existing right-of-way and would have minimal adverse environmental impacts. Some improvements would potentially have adverse impacts associated with widening and extending crossings at rivers, creeks and streams. Crossings would potentially impact riparian areas and sensitive biological habitats.

There could also be potential direct and indirect impacts to parks, recreational facilities, and cultural resources such as historic and archaeological sites. Direct impacts may include acquisition while indirect impacts include noise and visual impacts.

Several of the improvements would result in impacts on agricultural land, access to agricultural operations, and division of farmland.

Several of the improvements would be in close proximity to urban and residential areas that may result in direct and indirect impacts. Some of the impacts to communities and schools include traffic effects during construction and operation, increased noise levels and vibration and visual impacts. Some improvements would also result in impacts to property access and local circulation. Other potential impacts of the improvements include impacts on water quality due to erosion and storm run-off.

Improvements within this corridor would require coordination/permits from the California Public Utilities Commission, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, California Department of Fish and Game, State Historic Preservation Officer and U.S. Department of the Interior.

## Results of the Plan

This planning effort used stakeholder outreach, ridership modeling tools and technical operational and engineering analysis to develop the appropriate train frequencies, travel times, operational reliability and the supporting infrastructure improvements required to meet the growing demand for service in the San Joaquin Corridor.

The plan calls for six daily roundtrips between Bakersfield and Oakland/San Francisco and four between Bakersfield and Sacramento, and includes a demonstration service to San Jose. Implementing the 20-year plan would reduce the average running time between Bakersfield and Oakland/San Francisco by 20 percent and 25 percent between Bakersfield and Sacramento compared to existing travel times. With the increased service and reduced trip times, annual ridership would increase from the current 676,000 to over 2.76 million. The 20-year plan identifies $1.89 billion for infrastructure improvements, additional rolling stock and further analysis for route extensions.

### TRAIN FREQUENCY

In order to attain the service objectives of the 20-year plan, which are market-driven and based on ridership analysis, it was necessary to develop infrastructure improvements that would function as a cohesive whole rather than as a group of disjointed projects. Therefore, the customer will have reliable service at fixed, frequent and predictable intervals. As a result, this unified set of infrastructure improvements would allow passenger trains to offer a more marketable schedule that will appeal to a broader segment of travelers.

With Amtrak, BNSF, UPRR and ACE trains on the San Joaquin Corridor, it is essential that the projects proposed in the 20-year plan be implemented to meet future service goals. The plan calls for one additional roundtrip between Bakersfield and Oakland/San Francisco and two additional roundtrips between Bakersfield to Sacramento by 2005. By completion of the plan, one additional roundtrip from Bakersfield to Oakland/San Francisco and one roundtrip from Bakersfield to Sacramento would be in service. Several Immediate projects, such as the addition of a second main track between Oakley and Pittsburg (SJ-01) and both east and west of Stockton (SJ-02 and SJ-05) would serve to increase capacity and improve operational reliability on the corridor. Near-term projects, such as the second main track between Madera and Planada (SJ-24), would enhance the existing infrastructure to create additional capacity and allow additional trains. In addition, certain Vision projects, such as the addition of a second main track between Wasco and Corcoran (SJ-35), would also allow for increased frequency of service in the corridor.

### TRAVEL TIME

A key component of ridership growth is travel times competitive with other modes of travel. The infrastructure improvements proposed in the 20-year plan would add enough capacity, increase speeds, reduce station dwell times and relieve critical choke-points to significantly reduce travel times. The Near-term projects provide a significant benefit to travel times, with possible reductions of 70 minutes between Bakersfield and Oakland/San Francisco and 70 minutes between Bakersfield and Sacramento. A significant Immediate project that would have an impact on trip time is the grade crossing and track upgrade work through Fresno (SJ-09). Two Near-term projects that would serve to reduce travel times are the Akers to Lodi second main track (SJ-23), a project that completes the upgrade of the UPRR's Fresno Subdivision to permit improved running times and frequencies for the Sacramento service and the new connection at Port Chicago (SJ-20) between the BNSF and the UPRR Tracy Subdivision.

### OPERATIONAL RELIABILITY

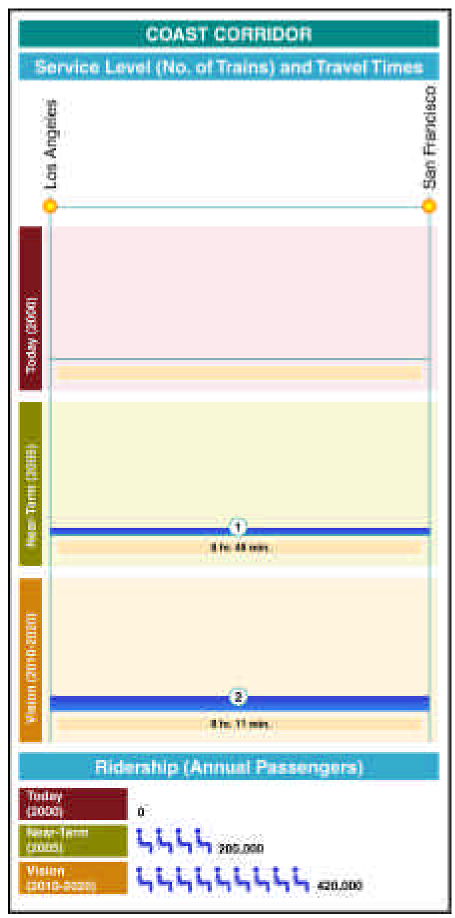
The 20-year plan identifies a blueprint of improvements that allow passenger and freight providers to consistently adhere to schedules and to reliably deliver the expected level of service. The limitations of the infrastructure in place require scheduling passenger trains to include excessive recovery time to compensate for these deficiencies. This is especially important along the mixed-use San Joaquin Corridor, where different types and classes of trains must compete with each other for operating windows. The challenges presented by the diversity of services have hindered the development of consistent schedules within the framework of current service schedules. The investments in the 20-year plan would address and overcome these deficiencies so that schedules can be developed and reliably operated.

# Coast Corridor

The Coast Corridor, with service between Los Angeles and Oakland/San Francisco, serves the growing coastal communities, providing access to beaches, wineries and other tourist activities. It also provides the communities located along the line with economic development opportunities and economical transportation alternatives to highway travel. Both ends of the corridor are busy with commuter and intercity trains. Amtrak's *Coast Starlight* serves the corridor from Los Angeles to San Jose and Oakland. In addition, UPRR owns the right-of-way and track between Moorpark and Tamien (San Jose) and operates freight service over the entire corridor.

At present, Pacific Surfliner service extends north of Los Angeles through Santa Barbara and on to San Luis Obispo (Figure CO-1). Four daily trains reach as far as Santa Barbara, with one extending to San Luis Obispo. For purposes of this study, projects between Los Angeles and San Luis Obispo were included in the Pacific Surfliner Corridor (Southern California) section of the study.


***Figure CO-1: Coast Corridor***




## Vision: On the Right Track

The vision calls for the introduction of a Coast Daylight service consisting of a single train each way, between downtown Los Angeles and downtown San Francisco as soon as possible, with a second roundtrip added as ridership demand increases. This would be the first direct intercity service between Los Angeles and San Francisco in almost 30 years.

The vision is to provide service between Los Angeles and San Francisco in slightly over eight hours, a 30-percent decrease.

Explosive growth in the Silicon Valley has increased the need to provide regular passenger service to the communities south of Gilroy. Service to Salinas and Monterey is being proposed as a critical need within the first five years of this program. Additional commuter service by San Benito County, over a portion of the Coast Corridor, is planned for Hollister. Furthermore, Caltrain service will be expanded between Gilroy and San Francisco.

## Commuter Service: Creating Synergies

Within the Caltrain service area, the plan contemplates a cooperative effort to provide added capacity for commuter service and intercity trains, including expanded service to Monterey, Salinas, Gilroy and Hollister. Because Coast Corridor trains would also operate as express trains between San Jose and San Francisco, Amtrak and its partners would coordinate with Caltrain on specific improvements needed for express operations, including new (third and fourth) main tracks, select station improvements and signal enhancements.

North of San Jose, Caltrain plans to add express service and expand operations from 78 trains a day to over 86 by 2005. Their goal is to construct segments of third and fourth main track from San Jose to San Francisco.

The convergence of these planned services would continue to create congestion in the San Jose terminal. Relief of that congestion should be a key objective of planning efforts in this region. Caltrain projects are provided in Table CO-1.

<u>San Jose (Tamien) to Gilroy Second Main Track</u>*:* This project would construct 21.00 miles of second main line track, including signal and grade crossing improvements, between San Jose (MP 48.40) and Gilroy (MP 78.40). There are two sections of single track that need an additional track to handle the expanded Caltrain and intercity service.

This project is an Immediate project in the Coast Corridor Improvements Program. A detailed narrative description and cost estimate for this project is found in CO-1.

## Coast Corridor Benefits

Direct Benefits

- 420,000 new intercity ridership annually
- Add 2 new roundtrip Los Angeles-San Francisco
- Add 4 new roundtrips Monterey/Salinas-San Francisco
- Reduce the Los Angeles-San Francisco schedule by 2 hours

Other Benefits

- Improve and expand commuter service
- Relieve conflicts with freight
- Improve Amtrak's *Coast Starlight* service
- Enhance freight mobility

<u>Guadalupe Creek and Los Gatos Creek Bridge Replacements</u>*:* This project would replace the existing Guadalupe Creek (MP 48.29) and Los Gatos Creek (MP 47.35) bridges in San Jose. The new bridges would be capable of accommodating four main line tracks. This project would improve operational reliability, reduce trip times and increase capacity.

<u>Caltrain Third and Fourth Main Line Tracks</u>*:* Caltrain has identified the need for four-track segments in two places and one three-track segment so that express trains could pass slower commuter trains. Efforts to coordinate planned new Coast Daylight and Monterey service are currently underway with Caltrain.

<u>Dumbarton Bridge Rehabilitation</u>*:* This project would rehabilitate the existing Dumbarton Bridge and its lead tracks to the Caltrain Peninsula Line and the Capitol Corridor Line. This project would improve operational reliability, reduce trip times and increase capacity. The project would provide the only transbay passenger rail connection.

<u>Station Improvements</u>*:* VTA and other public agencies are currently studying various options to improve the Gilroy Station (MP 77.30) and layover facility. This project would provide main line platforms, additional parking spaces, ticket vending machines and pedestrian access improvements needed to provide capacity for Caltrain and Amtrak trains. This project would improve operational reliability and increase capacity.

**Table CO-1**
**Caltrain Service**

**Caltrain Near-Term Recommendations**
**Immediate Projects (2-3 years):**

These projects are recommended for implementation within the near-term.

| **Project** | **Est. Cost*** |
|---|---|
| San Jose-Gilroy $2^{nd}$ Main (25.3 mi.) | $ N/A |
| Add $3^{rd}/4^{th}$ Main Commuter Express and Intercity Service | $ 82 |
| Caltrain Salinas Service | $ 21 |
| Guadalupe Cr. (MP 48.29) and Los Gatos Cr. Bridges (MP 47.35) | $ 50 |
| Rehab. Dumbarton Br. & lead tracks | $136 |
| Gilroy Station Improvements | $ 14 |
| Caltrain Station Improvements | $ 67 |
| Caltrain Signal Upgrades | $ 50 |
| Santa Clara-San Jose $4^{th}$ Main | N/A |
| Total | $420 |
| **Grand Total** | **$420** |

* Estimated costs presented in millions of dollars.

<u>*Caltrain Station Improvements*</u>*:* A number of Caltrain stations would be shared with Amtrak service, including San Jose (Tamien) (MP 47.50), Santa Clara (MP 44.70), Millbrae (MP 13.70), Palo Alto (MP 30.10), Mountain View (MP 36.10) and 4th and King Terminal in San Francisco (MP 0.16). These projects would provide the track improvements, longer platforms, passenger facilities and additional parking required for longer intercity trains. This project would improve operational reliability.

<u>*Caltrain Signal Upgrades, Phase 1 and 2*</u>*:* A three-phased signal improvement program would ultimately allow Caltrain to operate express trains at 90 mph. These first two phases would upgrade the signal system to provide for reliable train control at 79 mph.

<u>*Caltrain Salinas Service*</u>*:* This project would include track upgrades and station and grade crossing improvements. This project would improve operational reliability and increase capacity.

<u>*CP Coast to CP Tamien Fourth Main Track*</u>*:* This project, located between Santa Clara and San Jose (Tamien), would construct a 4.80-mile-long fourth main line track from CP Coast (MP 44.70) to CP Tamien (MP 49.50) to allow for segregated intercity passenger and freight operations. This project would also make track, station and intermodal facilities improvements to the San Jose (Tamien) Station (MP 47.50).

This project is an Immediate project in the Capitol Corridor Improvements Program. A detailed narrative description and cost estimate for this project is found in the Capitol Corridor section of this report.

## Freight Service: Creating Synergies

The Coast Corridor, which in its southern portion overlaps with the Pacific Surfliner Corridor, currently has one long-distance train, the Amtrak *Coast Starlight*. The Coast Corridor also supports extensive commuter operations in the San Jose and Los Angeles areas.

UPRR views the Coast Corridor as an important freight route and intends to protect its ability to grow traffic on the line, recognizing that significant capital investments would be required to meet this growth demand.

In the northern part of the Coast Corridor, UPRR moves significant tonnage of aggregate from the Watsonville area to Bay Area concrete plants. UPRR services oil operations in the Salinas Valley and they see the potential for additional petroleum shipments from the Santa Barbara Channel producers. The railroad also intends to reenter the perishable agriculture shipment markets in the Salinas and Oxnard areas. Port Hueneme's imported automobile wharves generate important traffic for UPRR, as do manufacturing and distribution facilities, particularly at the southern end of the corridor.

The Coast Corridor plan includes adding tracks such as second main track segments between San Jose (Tamien) to Gilroy Second Main Track (CO-01), the San Lucas Siding (CO-11) and Cuesta Second Main Line Track (CO-13). These projects would have the added benefit to freight trains of providing more locations to meet opposing trains. In the congested San Jose Terminal area, improvements proposed, including a fourth main track between CP Coast and CP Tamien would allow for increased operational flexibility and reliability.

## New Routes: Additional Opportunities for Rail Service

Coast Corridor trains would serve new stations at Pajaro and King City/Soledad and Caltrain stations at 4th and King, Millbrae, Palo Alto, Mountain View, and Santa Clara. New service from San Francisco to Monterey and Salinas is planned as part of the immediate needs program, providing four roundtrips a day to San Francisco, with two weekday, peak-hour, roundtrip trains to Salinas and two daily, midday trains to Monterey. Hollister commuter service is being planned by San Benito County Council of Governments. Two weekday peak-hour roundtrips are envisioned.

# Existing Coast Corridor Conditions

The Coast Corridor is a 470-mile-long route over the UPRR line from San Francisco to Los Angeles. The route is over joint freight/commuter rail trackage from San Francisco to Gilroy and from Moorpark to Los Angeles.

The Coast and Pacific Surfliner Corridors overlap between San Luis Obispo and Los Angeles. The existing conditions for the overlapping portion of the corridors between San Luis Obispo and Goleta, are described in this Coast Corridor section of the report. The existing conditions of the Goleta to San Diego segment are discussed in the Pacific Surfliner Corridor section of this report.

The Coast Corridor encompasses two ownership entities: UPRR and PCJPB. From San Francisco to CP Tamien in San Jose, the line is owned, operated and maintained by the PCJPB. The PCJPB operates the Caltrain commuter railroad service between San Francisco and Gilroy. From CP Tamien to Moorpark, the line is owned and operated by UPRR.

The Coast Corridor is comprised of three railroad subdivisions: the PCJPB Peninsula Subdivision, UPRR Coast Subdivision and UPRR Santa Barbara Subdivision.

The existing conditions of the Coast Corridor infrastructure are briefly described below. A more detailed description of the existing conditions can be found in Appendix E – Coast Corridor Existing Physical Conditions Report.

### DESCRIPTION OF SUBDIVISIONS

The Coast Corridor from San Francisco to San Luis Obispo is primarily a single-track line with a total of 67.38 miles of double track and 4.80 miles of triple track, primarily on the PCJPB Peninsula Subdivision.

The PCJPB Peninsula Subdivision is double track between MP 0.16 and MP 44.60 and between MP 47.80 and MP 49.50. A triple-track segment is located on the PCJPB Peninsula Subdivision between MP 44.60 and MP 47.80. The track structure is mostly 136-lb. CWR on timber ties, with some concrete ties and crushed rock ballast. On the PCJPB Peninsula Subdivision between San Francisco and CP Coast in Santa Clara, the Coast Corridor trackage is under the control and supervision of the PCJPB. Train traffic is controlled by an ABS signal system, with the exception of the first five miles out of San Francisco including the yard tracks at the station, which has a CTC signal system. Between CP Coast and CP Michael near San Jose (Tamien) Station, the line is controlled by PCJPB and has a CTC signal system.

The UPRR Coast Subdivision is single track with double-track segments located at Blossom Hill (MP 51.90 – MP 59.90), Gilroy (MP 78.40 – MP 83.16) and Watsonville Junction (MP 89.62 – MP 97.40). There are 16 sidings within the Coast Subdivision. These sidings are located at: Morgan Hill (MP 68.13 – 70.15), Moss Landing (MP 103.62 – MP 104.46), Castroville (MP 106.79 – MP 108.12), Salinas (MP 113.04 – MP 116.91), Gonzales (MP 130.47 – MP 131.98), Soledad (MP 139.60 – MP 141.16), King City (MP 159.26 – MP 160.66), San Ardo (MP 178.41 – MP 179.68), Wunpost (MP 185.30 – MP 186.55), Texaco (MP 188.60 – MP 189.62), Bradley (MP 191.60 – MP 192.74), McKay (MP 200.23 – MP 201.30), Templeton (MP 217.58 – MP 218.59), Santa Margarita (MP 229.52 – MP 233.19), Serrano (MP 238.86 – MP 240.60) and Chorro (MP 242.69 – MP 243.79).

The Coast Subdivision track structure is primarily 113- lb., 119-lb., 132-lb. and 136-lb. CWR on timber ties and crushed rock ballast. There are also scattered segments of 113-lb., 119-lb., 132-lb. and 136-lb. jointed rail on the Coast Subdivision.

Most of the Coast Subdivision south of CP Michael has an ABS signal system except:

- CP Michael (MP 49.50) to Luchessa (MP 78.40)
- Corporal (MP 83.00) to Logan (MP 89.70)
- Watsonville Junction (MP 97.30) to North Salinas (MP 113.30)
- South Santa Margarita (MP 233.10) to North San Luis Obispo (MP 248.50)

These four sections are isolated segments, or islands, of CTC signaling.

The Santa Barbara Subdivision is discussed in the Pacific Surfliner Corridor section of this report.

### STATION FACILITIES

There are four Amtrak passenger train stations on the Coast Corridor between San Francisco and San Luis Obispo. The details of joint usage, staffing and ownership are listed in Table CO-2.

**Table CO-2**
**Station Facilities**

| Station | Users | Staffed | Ownership |
|---|---|---|---|
| San Jose-Diridon | Caltrain, ACE, Amtrak | Yes | PCJPB |
| Salinas | Amtrak | Yes | Salinas Redevelopment Agency |
| Paso Robles | Amtrak | No | City of Paso Robles |
| San Luis Obispo | Amtrak | Yes | UPRR |

Six Caltrain stations, San Francisco ($4^{th}$ and King), San Bruno, Millbrae, Palo Alto, Mountain View, and San Jose (Tamien) are potential Coast Corridor station locations.

Catellus Corporation owns the San Francisco ($4^{th}$ and King) Station. The Millbrae, Mountain View and San Jose (Tamien) Stations are owned by PCJPB. The Palo Alto Station is owned by Stanford University. The Gilroy Station land is owned by Santa Clara Valley Transportation Authority (SCVTA) and the station building is owned by the City of Gilroy.

All Amtrak passenger stations have parking facilities. All Caltrain passenger stations, except San Francisco (Fourth and King Station), have parking facilities.

### LAYOVER AND MAINTENANCE FACILITIES

Amtrak does not have any maintenance facilities along the Coast Corridor. Facilities for car and locomotive maintenance are located at Los Angeles and Oakland.

There is a single layover track in San Luis Obispo for the Pacific Surfliner trains.

## The Coast Corridor Plan

The top priority in this corridor is to add new daily service between Los Angeles and downtown San Francisco. This train would enhance the current *Coast Starlight* service by providing an additional frequency of operation and additional service to communities throughout the Coast Corridor.

The individual improvement projects needed for the Coast Corridor for the three time frames – Immediate, Near-term and Vision – are listed in Tables CO-4 through CO-6, respectively, along with their estimated cost. A narrative description of each project and location maps are provided following the tables. The overall project costs for the three time frames are summarized in Table CO-3. The Coast and Pacific Surfliner Corridors overlap between San Luis Obispo and Los Angeles. Projects between San Luis Obispo and Los Angeles are described and costs estimated in the Pacific Surfliner section of this report. For projects north of Gilroy, refer to the Caltrain Summary section, discussed above.

## Table CO-3
## Coast Corridor 2000 – 2020 Summary Projects List

| Description | Project Cost (in millions, based on year 2000 dollars) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Project** | **Project Devel-opment (PE, EIR/S, CM)** | **Right-of-Way** | **Track-work/ Struc-tures** | **Stations** | **Signal/ Systems** | **Grade Cross-ings** | **Rolling Stock** | **Total Cost** |
| Immediate Projects Subtotal | 37.69 | 0.00 | 130.44 | 10.60 | 90.49 | 3.23 | 53.40 | **325.85** |
| Near-Term Projects Subtotal | 34.57 | 18.20 | 198.1 | 0.00 | 14.32 | 12.83 | 0.00 | **278.02** |
| Vision Projects Subtotal | 31.64 | 16.92 | 238.13 | 0.00 | 31.56 | 1.37 | 0.00 | **319.62** |
| **Coast Corridor Total** | **103.90** | **35.12** | **566.67** | **10.60** | **136.37** | **17.43** | **53.40** | **923.49** |

NOTES: PE: Preliminary Engineering; EIR/S: Environmental Impact Report/Statement; CM: Construction Management

### IMMEDIATE PERIOD

The Immediate-term projects described below and listed in Table CO-4 are projects identified for implementation on the Coast Corridor within the next three years.

## Table CO-4
## Coast Corridor Immediate Projects List

| Description | | Project Cost (in millions, based on year 2000 dollars) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Project No. | Project Name | Project Devel-opment (PE, EIR/S, CM) | Right-of-Way | Track-work/ Structures | Stations | Signal/ Systems | Grade Crossings | Rolling Stock | **Total Cost** |
| CO-01 | San Jose (Tamien) to Gilroy Second Main Track | 8.86 | 0.00 | 49.96 | 0.00 | 14.47 | 2.18 | 0.00 | **75.47** |
| CO-02 | Gilroy to San Luis Obispo Track Upgrades | 8.38 | 0.00 | 61.48 | 0.00 | 14.67 | 0.00 | 0.00 | **84.53** |
| CO-03 | Gilroy to San Luis Obispo Signal Up-grades | 9.91 | 0.00 | 2.72 | 0.00 | 59.24 | 0.00 | 0.00 | **71.87** |
| CO-04 | Pajaro, King City and Salinas Stations | 1.00 | 0.00 | 0.85 | 5.43 | 0.00 | 0.00 | 0.00 | **7.28** |
| CO-05 | Monterey Branch Up-grades | 2.61 | 0.00 | 15.43 | 2.50 | 2.11 | 1.05 | 0.00 | **23.70** |
| CO-06 | Rolling Stock – Modern Intercity Equipment | 3.30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 26.70 | **30.00** |
| CO-07 | Rolling Stock – Stan-dard Intercity Equip-ment | 3.30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 26.70 | **30.00** |
| CO-08 | Passenger Service En-hancements | 0.33 | 0.00 | 0.00 | 2.67 | 0.00 | 0.00 | 0.00 | **3.00** |
| **Subtotal** | | **37.69** | **0.00** | **130.44** | **10.60** | **90.49** | **3.23** | **53.40** | **325.85** |

*San Jose (Tamien) to Gilroy Second Main Track (CO-01)*: The addition of 21.0 miles of second main line track between San Jose and Gilroy would significantly improve the infrastructure capacity to handle expanded Caltrain and intercity rail service. This addition of track, along with signal and rail/highway grade crossing improvements in these segments, would increase capacity, reduce average trip times and improve operational reliability through the section.

The first segment of this project would involve construction of a second main track between CP Tamien (MP 48.40) and CP Lick (MP 51.90). With an additional 3.50 miles of double main line at FRA Class 4 track, maximum passenger train speeds of 79 mph could be attained. Four new No. 20 turnouts would be installed as part of this project, along with construction of a 100-foot and a 140-foot through plate girder (TPG) trestle. Also included in the scope of this project would be two new CTC interlockers.

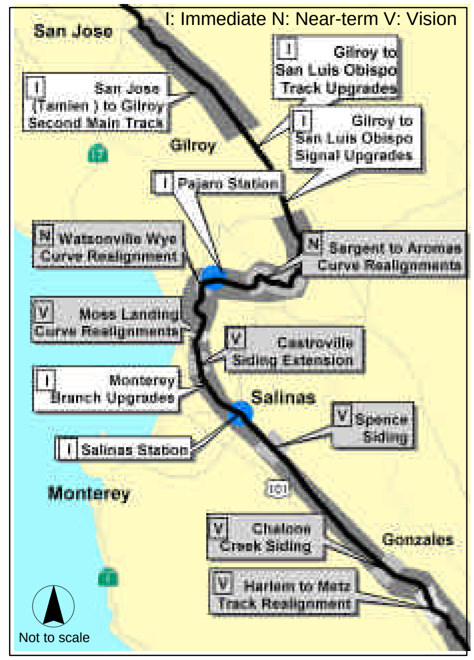



***Figure CO-2: San Jose to Soledad***

Another section of second main track would be provided between Coyote (MP 59.90) and Gilroy (MP 78.40). An additional 21.5 miles of FRA Class 4 track would increase passenger train speeds to 79 mph. Also included in the scope of this project would be two new No. 20 turnouts, a 110-foot TPG trestle and two new CTC interlockings.

<u>*Gilroy to San Luis Obispo Track Upgrades (CO-02)*</u>: In this project, capacity would be increased, operational reliability would be improved and train meet delays would be reduced by upgrading a total of 67.30 miles of existing track from FRA Class 3 to Class 4. These improvements would encompass sections of track between MP 78.40 in Gilroy and MP 248.44 in San Luis Obispo would be upgraded to include new CWR, spot timber tie replacement, ballasting and track surfacing and re-aligning of the track structure. The following segment limits are included:

| | |
|---|---|
| MP 78.60 – MP 83.50 | MP 188.20 – MP189.50 |
| MP 91.20 – MP 96.60 | MP 191.00 – MP 208.00 |
| MP 97.70 – MP104.80, | MP 209.80 – MP 215.00 |
| MP 115.00 – MP 118.70 | MP 216.60 – MP 221.70 |
| MP 151.30 – MP152.10 | MP 224.00 – MP 225.00 |
| MP 159.80 – MP 160.70 | MP 226.00 – MP 226.70 |
| MP 182.60 – MP 184.80 | MP 228.40 – MP 231.60 |
| MP 172.70 – MP181.50 | |

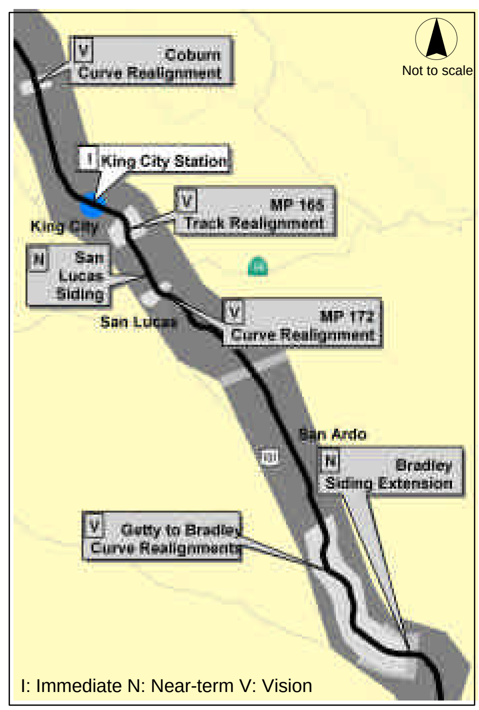



***Figure CO-3: Soledad to San Miguel***

Other project improvements for this section would include replacing 11 existing No. 12 turnouts with No. 14 turnouts with trailable switches and rehabilitating 17,000 feet of sidings at Salinas (MP 113.48 - MP 115.14) and Soledad (MP 139.60 - MP 141.16).

<u>*Gilroy to San Luis Obispo Signal Upgrades (CO-03)*</u>: New signal equipment would be installed at various locations along the Coast Corridor between Gilroy and San Luis Obispo. Fifty-two miles of new CTC signaling would be provided. These elements would improve the operational reliability and capacity of this segment.

The existing CTC signal system would be extended from MP 80.10 near Gilroy to MP 113.04 near Salinas by installing new CTC communications and upgrading the existing CTC signal system with solid-state electronics. Two new power-operated No. 20 turnouts and control points would also be installed in this segment. The existing CTC signal system would also be extended southward, from MP 113.04 near Salinas to MP 139.60 near Soledad, with new CTC communications and an upgrade of existing CTC signal system with solid-state electronics.

In addition, an island CTC signal system would be installed from MP 167.20, located seven miles south of King City, to MP 192.74 at Bradley, 20 miles north of Paso Robles.

*Pajaro, Salinas and King City Stations (CO-04):* Two new Amtrak stations and significant improvements to a third are planned for the Coast Corridor to support proposed expanded service of the Coast Daylight.

A new station at Pajaro (MP 95.20) would include major components such as a 1,000-foot-long station platform with partial canopies and a 200-space parking lot. A new Amtrak station is also planned for King City (MP 160.30). The King City Station may ultimately be sited in Soledad or King City and key elements of the station would include a 1,000-foot-long station platform with partial canopies and a 200-space parking lot.

The Salinas Amtrak Station at MP 114.90 would also be improved with upgraded and lengthened platforms to meet the Americans with Disabilities Act (ADA) requirements. Partial canopies would be installed and the station platform would be lengthened to 1,000 feet as part of this project.

*Monterey Branch Upgrades (CO-05):* A new Seaside Station would be constructed with this project, along with track upgrades and bridge, station, and rail/highway grade-crossing improvements.

*Rolling Stock – Modern Intercity Tilt Equipment (CO-06):* Two sets of modern intercity equipment with tilt (active or passive) capabilities would be purchased by this project to operate roundtrip Amtrak Daylight service along the Coast Corridor between San Francisco and Los Angeles. Train sets with tilt equipment would allow the Daylight service to operate at train speeds up to 79 mph on the Coast Corridor, reducing the need for some infrastructure improvements related to decreasing track curvature and increasing track superelevation.

In lieu of several infrastructure improvements, the use of tilt train technology along the Coast Corridor was considered while developing the proposed improvement projects. Using tilt equipment along the this corridor would reduce the number of infrastructure improvement projects required, thereby reducing the associated capital costs.

*Rolling Stock – Modern Intercity Equipment (CO-07):* Two modern trainsets, with locomotives, would be purchased by this project to operate the two roundtrips per day in the Monterey/Salinas passenger service.

*Passenger Service Enhancements (CO-08):* Customer satisfaction would be improved with installation of new ticket vending machines, message boards and automated fare collection systems in this project.

### NEAR-TERM PERIOD

Near-term projects, listed in Table CO-5, have been identified and recommended to achieve the four- to eight-year service goals for the Coast Corridor, while making a significant investment towards the goals of the 20-year vision for the corridor.

**Table CO-5**
**Coast Corridor Near-Term Projects List**

| Description | | Project Cost (in millions, based on year 2000 dollars) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Project No. | Project | Project Devel-opment (PE, EIR/S, CM) | Right-of-Way | Track-work/ Structures | Stations | Signal/ Systems | Grade Crossings | Rolling Stock | **Total Cost** |
| CO-09 | Sargent to Aromas Curves Realignments | 14.32 | 13.81 | 90.55 | 0.00 | 3.47 | 0.00 | 0.00 | **122.15** |

**Table CO-5 (continued)**
**Coast Corridor Near-Term Projects List**

| Description | | Project Cost (in millions, based on year 2000 dollars) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Project No. | Project | Project Devel-opment (PE, EIR/S, CM) | Right-of-Way | Track-work/ Structures | Stations | Signal/ Systems | Grade Crossings | Rolling Stock | **Total Cost** |
| CO-10 | Watsonville Wye Curves Realignments | 1.34 | 1.04 | 6.18 | 0.00 | 2.67 | 0.00 | 0.00 | **11.23** |
| CO-11 | San Lucas Siding | 0.88 | 0.00 | 4.11 | 0.00 | 2.57 | 0.00 | 0.00 | **7.56** |
| CO-12 | Bradley Siding Exten-sion | 1.00 | 0.00 | 4.06 | 0.00 | 2.74 | 0.37 | 0.00 | **8.17** |
| CO-13 | Cuesta Second Main Line Track | 15.49 | 3.35 | 93.20 | 0.00 | 2.87 | 0.00 | 0.00 | **114.91** |
| CO-14 | Safety and Mobilization Enhancements | 1.54 | 0.00 | 0.00 | 0.00 | 0.00 | 12.46 | 0.00 | **14.00** |
| **Subtotal** | | **34.57** | **18.20** | **198.1** | **0.00** | **14.32** | **12.83** | **0.00** | **278.02** |

<u>Sargent to Aromas Curve Realignments (CO-09)</u>: This project would entail a major curve realignment nine miles south of Gilroy, from Sargent to Aromas, between MP 83.00 and MP 92.50. A reduction of track curvature to a maximum of two degrees would increase speeds from 35 to 90 mph on seven curves in this segment. A total of 5.70 miles of new double main track and embankment would be constructed, along with installation of three No. 20 turnouts. Installation of a new CTC signal system and construction of a 940-foot deck plate girder (DPG) trestle and a 300-foot TPG trestle would complete the realignment project.

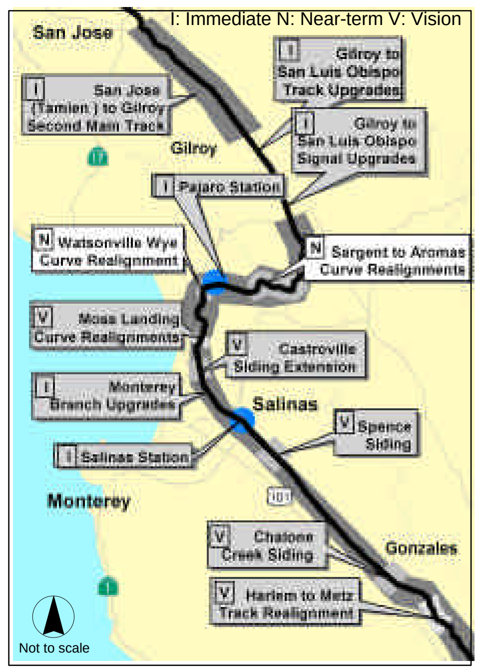


***Figure CO-4: San Jose to Soledad***

<u>Watsonville Wye Curve Realignments (CO-10)</u>: The Watsonville Wye would be realigned from MP 96.30 to MP 97.70 to increase train speeds and reduce trip times. The track curvature would be reduced by 2 degrees, 30 minutes to 1 degree, 30 minutes and upgraded to FRA Class 4 standards to allow for speeds up to 79 mph. Also included with this project would be new No. 14 turnouts, a new CTC signal system and construction of a new overpass.

<u>San Lucas Siding (CO-11)</u>: This infrastructure improvement project is located nine miles south of King City and would involve a 2.00-mile new siding at San Lucas, from MP 167.20 to MP 169.20. This track would be constructed to FRA Class 4 standards for a maximum passenger train speed of 79 mph. New No. 20 turnouts would be installed at MP 167.20 and MP 169.20, along with a new CTC signal system for the new siding. A new TPG trestle would also be installed. This new siding would allow for additional capacity and operational reliability resulting in a reduction in trip times for both freight and passenger traffic.

<u>Bradley Siding Extension (CO-12)</u>: This project would be an approximate 0.86-mile northward extension of the existing siding at Bradley, located 20 miles north of Paso Robles, and adjacent to the California National Guard's Camp Roberts Reservation at MP 191.60 to MP 190.74. The track would be constructed on new embankment to FRA Class 4 standards for a maximum passenger train speed of 79 mph. The existing turnout at MP 192.74 would be removed and a No. 20 turnout would be installed in its place. The

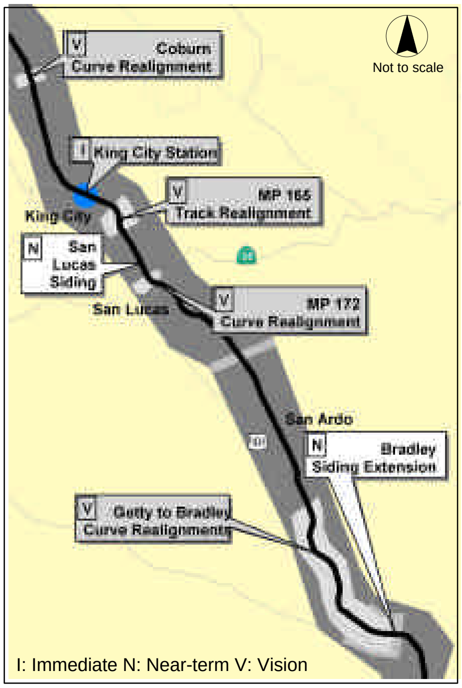



***Figure CO-5: Soledad to San Miguel***


***Figure CO-6: San Miguel to Pismo Beach***

existing turnout at MP 191.60 would also be removed and a new No. 20 turnout would be installed at MP 190.74. A new CTC signal system would also be installed for the siding extension. This siding extension would provide additional capacity and operational reliability and reduced trip times for both freight and passenger traffic.

*Cuesta Second Main Line Track (CO-13):* This project, located 14 miles north of San Luis Obispo, would be a 2.42-mile extension of the Santa Margarita second main line track to the north portal of Tunnel 6 at MP 233.20 to MP 235.62. This track extension would allow for passenger trains to pass each other without stopping on the north side of the Cuesta Grade. Curve reductions, also planned as part of this project, would increase speeds from 30 to 55 mph. The results of these improvements would be to reduce travel times, increase capacity and reduce train delays for both passenger and freight trains in this segment.

*Safety and Mobility Enhancements (CO-14):* This project would identify specific roadway/railroad intersection improvements to improve rail/highway grade crossing safety and reduce traffic congestion on local streets as frequencies and speeds are increased along the Coast Corridor. Improvements would include bettering roadway approaches, widening roads, upgrading warning systems and closing crossings.

### VISION

Vision projects listed in Table CO-6 and described below are those projects that would be implemented over a nine- to twenty-year period to meet the 20-year service and trip time goals for the Coast Corridor.

**Table CO-6**
**Coast Corridor Vision Projects List**

| Description | | Project Cost (in millions, based on year 2000 dollars) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Project No. | Project Name | Project Devel-opment (PE, EIR/S, CM) | Right-of-Way | Track-work/ Structures | Stations | Signal/ Systems | Grade Crossings | Rolling Stock | **Total Cost** |
| CO-15 | Moss Landing Curve Realignments | 0.24 | 0.00 | 1.95 | 0.00 | 0.35 | 0.00 | 0.00 | **2.54** |
| CO-16 | Castroville Siding Ex-tension | 1.18 | 0.00 | 4.53 | 0.00 | 0.92 | 0.00 | 0.00 | **6.63** |
| CO-17 | Spence Siding | 1.03 | 0.00 | 8.42 | 0.00 | 5.92 | 0.00 | 0.00 | **15.37** |
| CO-18 | Chalone Creek Siding | 1.86 | 1.93 | 8.04 | 0.00 | 3.50 | 0.42 | 0.00 | **15.75** |
| CO-19 | Harlem to Metz Track Realignment | 2.58 | 2.48 | 20.73 | 0.00 | 2.13 | 0.00 | 0.00 | **27.92** |
| CO-20 | Coburn Curve Re-alignment | 0.06 | 0.00 | 0.52 | 0.00 | 0.12 | 0.00 | 0.00 | **0.70** |
| CO-21 | MP 165 Track Re-alignment | 1.87 | 2.74 | 10.25 | 0.00 | 4.75 | 0.00 | 0.00 | **19.61** |
| CO-22 | MP 172 Track Re-alignment | 0.12 | 0.00 | 1.21 | 0.00 | 0.09 | 0.00 | 0.00 | **1.42** |
| CO-23 | Getty to Bradley Curve Realignments | 2.25 | 1.32 | 19.52 | 0.00 | 1.16 | 0.95 | 0.00 | **25.20** |
| CO-24 | Mc Kay to Wellsona Curve Realignments | 1.00 | 0.25 | 8.48 | 0.00 | 0.73 | 0.00 | 0.00 | **10.46** |
| CO-25 | Wellsona Siding | 1.74 | 0.09 | 9.59 | 0.00 | 3.43 | 0.00 | 0.00 | **14.85** |
| CO-26 | Wellsona to Paso Robles Curve Realign-ments | 6.33 | 2.66 | 53.63 | 0.00 | 1.99 | 0.00 | 0.00 | **64.61** |
| CO-27 | Templeton Siding Ex-tension | 1.14 | 0.00 | 5.68 | 0.00 | 3.21 | 0.00 | 0.00 | **10.03** |
| CO-28 | Templeton to Henry Curve Realignments | 7.19 | 3.80 | 60.39 | 0.00 | 1.98 | 0.00 | 0.00 | **73.36** |
| CO-29 | Henry to Santa Marga-rita Curve Realign-ments | 3.05 | 1.65 | 25.19 | 0.00 | 1.28 | 0.00 | 0.00 | **31.17** |
| **Subtotal** | | **31.64** | **16.92** | **238.13** | **0.00** | **31.56** | **1.37** | **0.00** | **319.62** |

*Moss Landing Curve Realignments (CO-15):* This major curve realignment project, located 23 miles south of Gilroy would relocate four main line curves for a total of 1.1 miles in length at Moss Landing, between MP 98.10 and MP 104.90. Approximately 1.10 miles of track would be realigned between tangents to reduce track curvature to a maximum of one degree, 42 minutes. Curve No. 98 would be realigned to 1 degree; curve Nos. 100 and 101 would be realigned to 1 degree, 45 minutes; and curve No. 105 would be realigned to 1 degree, 35 minutes. This infrastructure improvement would increase speeds to at least 105 mph, which would result in reduced trip times and increased capacity.

*Castroville Siding Extension (CO-16):* This project, located six miles north of Salinas, would be an approximately 1.33-mile southward extension of the existing Castroville siding, from MP 108.12 to MP 109.45. The track would be constructed on new embankment to FRA Class 4 standards for a maximum passenger train speed of 79 mph. The existing turnout at MP 106.79 would be removed and a No. 20 turnout would be installed in its place. The existing turnout at MP 108.12 would be removed and a new No. 20 turnout would be installed at MP 109.45. New CTC signaling would also be installed for the entire siding extension. A new 60-foot pile trestle would be installed along with new signaled grade crossings.

This siding extension would provide additional capacity and operational reliability for both freight and passenger traffic.

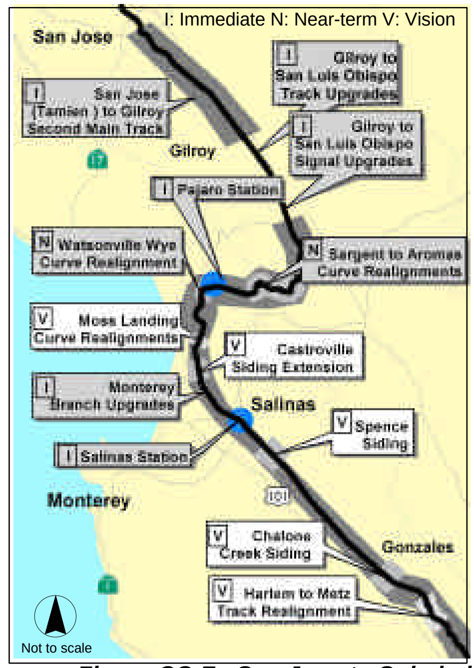


*Figure CO-7: San Jose to Soledad*

<u>Spence Siding (CO-17)</u>: This infrastructure improvement would be a 2.00-mile new siding at Spence, located 7.50 miles south of Salinas, from MP 121.40 to MP 123.40. This track would be constructed on new embankment to FRA Class 4 standards for a maximum passenger train speed of 79 mph. New No. 20 turnouts would be installed at MP 121.40 and MP 123.40, along with a new CTC signal system. Additional capacity and operational reliability for freight and passenger traffic are provided by this new siding.

<u>Chalone Creek Siding (CO-18)</u>: This infrastructure improvement would be a 2.00-mile new siding at Chalone Creek, from MP 147.00 to MP 149.00, located 11 miles north of King City. The result of this new siding would be additional capacity and operational reliability for freight and passenger traffic. This track would be constructed on new embankment to FRA Class 4 standards for a maximum passenger train speed of 79 mph. New No. 20 turnouts would be installed at MP 147.00 and MP 149.00 and a new CTC signal system would be installed for the new siding. A new rail/highway grade crossing with flashing light signals and short arm gates would also be installed at MP 147.68.

<u>Harlem to Metz Track Realignments (CO-19)</u>: This project is located 13 miles north of King City and would realign 7.40 miles of main line track between Harlem and Metz, from MP 143.90 to MP 151.30. A reduction of maximum track curvature to one degree would reduce trip times and increase train speeds in this section from 55 to 135 mph. This project would also constructs 7.40 miles of new main track and 3.60 miles of embankment on new right-of-way. The fourteen existing curves would be reduced to six curves with a one-degree maximum curvature.

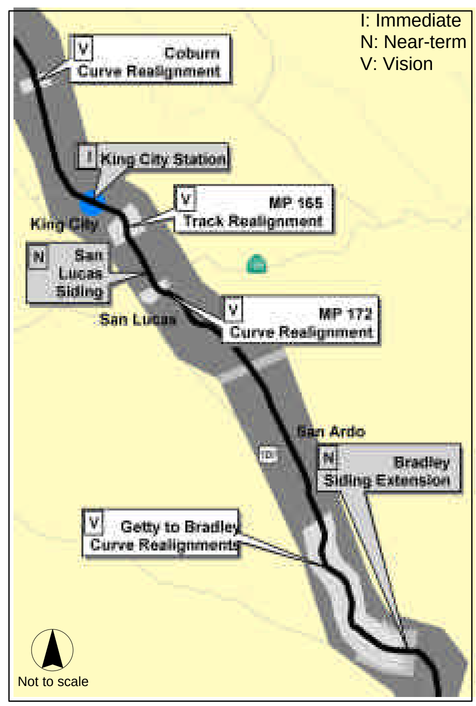


*Figure CO-8: Soledad to San Miguel*

<u>Coburn Curve Realignment (CO-20)</u>: This project would relocate 0.40 mile of main line track between MP 154.30 and MP 154.70 at Coburn, located 5.50 miles north of King City. A reduction in maximum curvature of Curve No. 154 to 1 degree, 20 minutes would increase speeds to 110 mph and would result in reduced trip times and increased capacity.

<u>MP 165 Track Realignment (CO-21)</u>: This curve realignment project is located five miles south of King City and would realign 1.60 miles of main line track between MP 164.00 and MP 165.60 to reduce track curvature to one degree maximum. This project would construct 1.60 miles of new main track, including one-degree curves at MP 164.00 and MP 165.20. Five existing curves would be eliminated as part of this project. New right-of-way would be required for the realignment, as well as construction of a new grade separation. Train speeds in this segment would be consequently able to increase from 60 to 125 mph and reduced trip times would result.

<u>MP 172 Curve Realignment (CO-22)</u>: Located 12.00 miles south of King City, this project would realign one-half mile of main line track between MP 172.00 and MP 172.50 to reduce the maximum track curva-

ture to 1 degree, 20 minutes. This infrastructure improvement would reduce trip times and increase capacity by increasing passenger train speeds from 79 to 110 mph.

<u>*Getty to Bradley Curve Realignments (CO-23)*</u>*:* This curve realignment project, located 26 miles north of Paso Robles, would relocate 6.00 miles of main line track between Getty and Bradley, from MP 181.50 to MP 191.00. The project would entail construction of 6.00 miles of new main track and embankment on new right-of-way. The six existing curves would be reduced to three curves with a one-degree maximum curvature and approximately 1,100 feet of public roadway would be relocated as a result of this project. This curve reduction project would increase train speeds from 70 to 110 mph, which would lead to reduced trip times and increased capacity.

<u>*McKay to Wellsona Curve Realignments (CO-24)*</u>*:* This major track realignment project is located 12 miles north of Paso Robles and would relocate 4.00 miles of main line track between McKay and Wellsona, from MP 194.00 to MP 207.00. Six miles of new main track and embankment on new right-of-way would be constructed. Seven existing curves on this segment would be reduced to six curves with a one-degree maximum curvature and approximately 1,100 feet of public and private roadway would be relocated for this project. This project would also relocate the adjacent U.S. Highway 101, between MP 194.00 and MP 194.70. This track curvature reduction project would reduce trip times and increase capacity by increasing train speeds from 75 to 110 mph.


***Figure CO-9: Soledad to Pismo Beach***

<u>*Wellsona Siding (CO-25)*</u>*:* This infrastructure improvement project is located six miles north of Paso Robles and would consist of an approximate 2.00-mile new siding at Wellsona, from MP 205.60 to MP 207.60. The track would be constructed on new embankment to FRA Class 4 standards for a maximum passenger train speed of 79 mph. New No. 20 turnouts would be installed at MP 205.60 and MP 207.60, along with new CTC signaling for the entire length of the siding. Additional capacity and operational reliability for both freight and passenger traffic result from this project.

<u>*Wellsona to Paso Robles Curve Realignments (CO-26)*</u>*:* This project, located between Wellsona and Paso Robles, would relocate 4.30 miles of main line track from MP 208.30 to MP 216.70 to reduce track curvature and constructs 4.30 miles of new main track and embankment. The nine existing curves would be reduced to six curves with a two-degree maximum curvature. This improvement project would increase train speeds from 70 to 110 mph, which would result in reduced trip times and increased capacity.

<u>*Templeton Siding Extension (CO-27)*</u>*:* This siding extension project is located four miles south of Paso Robles in Templeton. This project would be a 1.01-mile northward extension of the existing siding at Templeton, from MP 217.58 to MP 218.59. The track would be constructed on new embankment to FRA Class 4 standards for a maximum passenger train speed of 79 mph. The existing turnout at MP 218.59 would be removed and a No. 20 turnout would be installed in its place. The existing turnout at MP 217.58 would also be removed and a new No. 20 turnout would be installed at MP 216.59. A new CTC signal system would also be installed as part of the entire siding extension. This project would provide additional capacity and operational reliability for both freight and passenger traffic.

<u>*Templeton to Henry Curve Realignments (CO-28)*</u>*:* This project, located ten miles south of Paso Robles, would relocate 4.30 miles of main line track between Paso Robles and Henry. The project would construct 4.30 miles of new main track and embankment on new right-of-way, and the twelve existing curves would be reduced to six curves with a three-degree maximum curvature. A new concrete railroad trestle would be constructed over Graves Creek along with a new overpass in this section. This track curvature reduction project would reduce trip times and increase capacity by increasing train speeds from 65 to 110 mph.

*Henry to Santa Margarita Curve Realignments (CO-29):* This infrastructure project is located 19 miles north of San Luis Obispo and would relocate 2.10 miles of main line track between Henry and Santa Margarita. The project would construct 2.10 miles of new main track and embankment on new right-of-way. The six existing curves would be reduced to four curves with a three-degree maximum curvature. This track curvature infrastructure improvement would increase train speeds from 65 to 110 mph, resulting in reduced trip times and increased capacity.

# Analysis Methodology

### RIDERSHIP MODELING

Ridership on the new Coast Corridor would come from three sources: the fast-growing population in Central Coast cities, induced trips and diversions from the automobile. The new Coast train would fill a key gap linking Central Coast cities to the Pacific Surfliner Corridor and the Capitol Corridor.

One of the key industries along the Central Coast is tourism. The Coast Corridor would allow the expansion of visitors to the Central Coast without increasing the number of automobiles. Overall, the Coast Corridor is expected to generate 434,000 passengers by 2020. As was the case with the other corridors, current fares were assumed.

### OPERATIONAL MODELING

The network model for the 2005 service scenario represents the typical conditions for train operations given the infrastructure improvements that are forecast to be in place by that time. While additional modeling efforts did not continue beyond the 2008 time horizon, it is expected that train delays would continue to decrease as further improvements are developed for continued enhancement of train operations. The benefits that would be realized for the Coast Corridor are based on a well-defined set of infrastructure improvements resulting in increased capacity, reduced maintenance costs and/or enhanced reliability, and reduced trip time.

These infrastructure improvements would represent a significant step in upgrading the physical plant on the Coast route and responding to the increased demand on California's passenger and freight railroads. Continued cooperation and coordination between Amtrak, freight railroads and the commuter railroads are important in order to fully experience the benefits proposed in this plan. The growing demand on the rail infrastructure of the Coast Corridor requires a dynamic train scheduling process that considers the projections for service as modeled for this plan along with the flexibility to be sensitive to future service changes from the various rail operators on the corridor.

To obtain the most accurate future operations scenarios, information on planned operations was requested from all rail operators in the Coast Corridor. In 2005, service adjustments would need to be made based on current operations to ensure reliability of all services in the Coast Corridor. This process will continue to require ongoing coordination as other services are introduced. Certain schedule adjustments can be expected based on the necessity to integrate all operators' schedules.

Incremental benefits such as additional capacity and increased speeds would certainly accrue once the related infrastructure improvements are in place. Each year through 2005, Amtrak and its partners will be reevaluating the physical plant and adjusting service improvements and schedule times until the 2005 service levels are reached. Passengers would experience these incremental benefits, such as improved reliability and reduced trip time, as the projects are implemented.

#### Service

Berkeley Systems RTC simulation software was used to identify reductions in trip time for the Coast Corridor. Detailed physical and operational attributes of the corridor were built into the model as part of the development of a fully integrated rail network for the entire state. These infrastructure characteristics were coded into the model, as described in the Coast Corridor Project List in this section, according to the project's associated planning horizon.

Service frequencies for this corridor were based on forecasted passenger demand. That demand calls for one daily roundtrip between Los Angeles and San Francisco by 2005, as compared with no direct services between these two points in 2000. In addition, two daily roundtrips between San Francisco and Monterey (Seaside) were modeled for the 2005 case.

The stringline graph (Figure CO-10) represents train movements from San Francisco to Burbank Airport station along the Coast Corridor. Four Amtrak trains run on this corridor over a 24-hour period. A large number of commuter and freight trains run between San Francisco and San Jose, with many meets throughout this segment. Another area of frequent meets is in the area between Santa Barbara and Burbank Airport station.

The simulation effort conducted as part of this study involves development of three important component results: stringline graphs, animation and performance statistics.

Stringlines are a graphic display of the train movements on the corridor and provide a representation of train meets, in this case the trains running in the Coast Corridor. The stringlines vividly show whether the passenger trains would make reasonably well-timed meets with other trains on the corridor. With passenger trains having priority over freight trains, they are simulated to receive the least amount of delay minutes compared with freight trains on the corridor. Resolution of train conflicts is a result of analyses based on stringline observations and dynamic animation.

Animation is an important visual tool for observing train movements in the simulation. This utility provides the modeler with the ability to determine whether the train dispatching associated with the infrastructure improvements is actually contributing to enhanced train movements. Once the stringlines were created, adjustments in the animation were made. For example, in some cases, the trains may use a track that is not the best track to occupy from an operational perspective. When this happens, the modeler has the ability to adjust the simulation to include an infrastructure characteristic that influences the train to operate

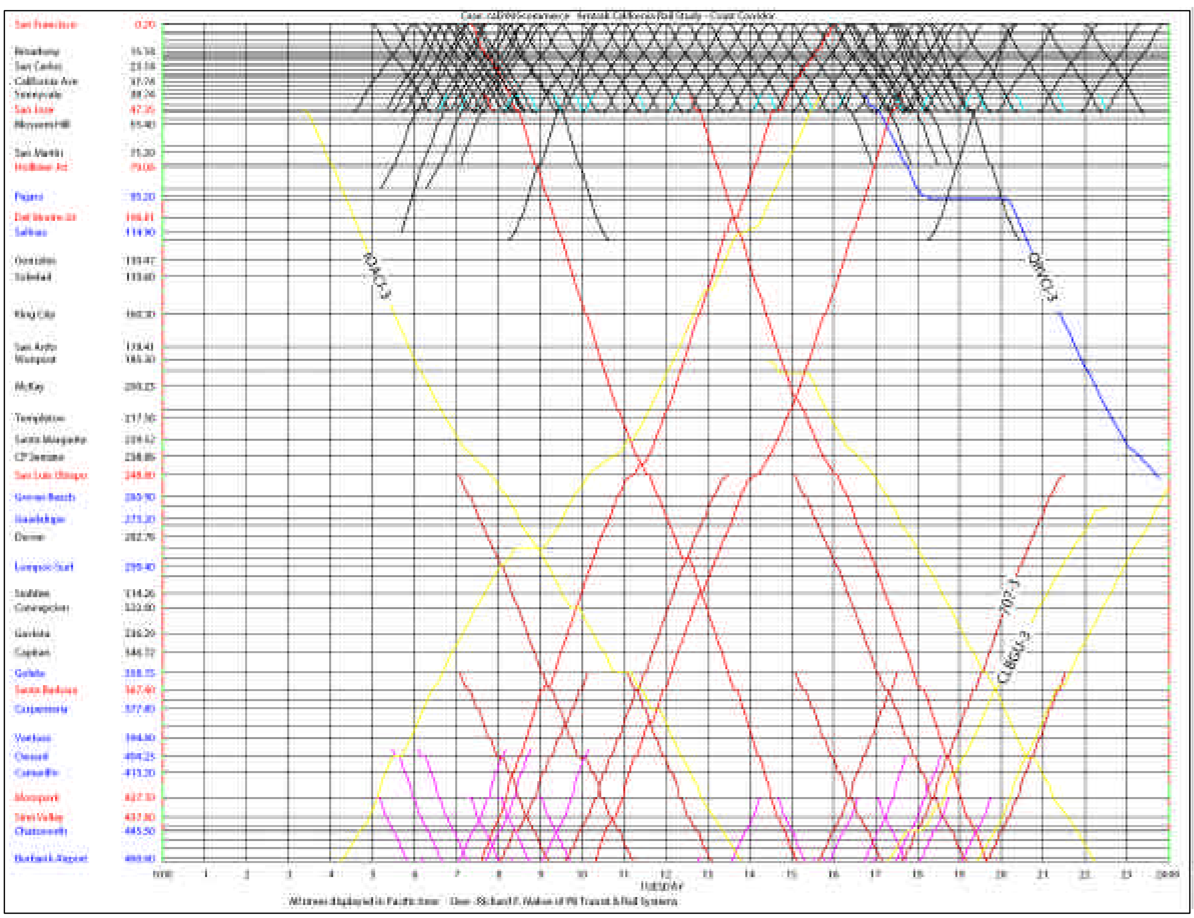


***Figure CO-10: Coast Corridor Stringline Diagram***

along a route that would likely result from the most logical dispatching dynamics. The modeling reflects the decisions a dispatcher would make for the most effective operating scenario.

With stringlines and animation of the corridor in place, the following performance statistics were developed by train type and corridor:

- The number of trains
- The average speed of the particular train
- The total train miles
- The delay minutes per 100 train miles

These statistics were developed while evaluating service and running time goals for the Coast Corridor.

The trip time results of a full dispatch simulation model run for 2005 are shown in Table CO-6. The 2000 times are from Amtrak's 2000 timetable. The 2005 run times represent the trip times resulting from improvements implemented in a five-year time frame. The shortest times represent a trip time with minimal interference between train movements, while the longest trip times reflect dynamics such as the effects of increased freight train movements requiring passenger trains to be slowed at certain locations along the particular segment.

**Table CO-6**
**Coast Corridor RTC Model Run Results**

| | Actual 2000 | RTC Shortest Results | RTC Longest Results | Five-Year Plan 2005 Goal (Near-term) |
|---|---|---|---|---|
| Los Angeles – San Francisco | N/A | 8 hrs., 39 min. | 8 hrs., 52 min. | 8 hrs., 45 min. |
| San Francisco -- Hollister | -- | 2 hrs., 17 min. | 2 hrs., 25 min. | -- |
| San Francisco – Monterey (Seaside) | -- | 2 hrs., 20 min. | 2 hrs., 35 min. | -- |

As evident in the simulation trip time results shown in Table CO-6, implementing the projects would provide the means by which freight trains could operate in harmony with passenger train movements over this corridor. The overall outcome would be that both freight and passenger services would run reliably, with minimal delays. As displayed on the stringline chart (Figure CO-10), the train movements shown indicate that the infrastructure improvements based on the Immediate-term projects plus the first two years of the Near-term projects (through 2005) would provide sufficient capacity to reliably operate the volume of trains forecasted.

In executing simulations on both the base and Immediate-term infrastructure, it was very clear that the spacing of passing sidings, as well as the equipping of these sidings with modern CTC systems, would improve not only the on-time performance of passenger trains, but also the effective through-running of freight trains. On typical "meets" on the Coast Line, 10 to 20 minutes could be lost between opposing freight and passenger trains.

Coast Corridor passenger service would benefit from improvements to other corridors. South of San Luis Obispo, these benefits would include work planned under the Pacific Surfliner Corridor. In the San Jose area, additional tracks and signals are planned as part of the Capitol Corridor work.

## Environmental and Community Considerations

The 20-Year Improvement Plan includes construction and implementation of rail improvements within the Coast Corridor. Depending on funding, location, nature of construction and related environmental impacts, it is anticipated that improvements would require environmental review in accordance with CEQA and/or NEPA. Appendix P, Coast Corridor Recommended Improvement Projects Summary, details the preliminary environmental evaluation of the proposed improvements for this corridor.

Many of the proposed Coast Corridor improvements may be Categorically Excluded from NEPA and/or Statutorily or Categorically Exempt from CEQA. If any improvements are found to have potentially significant adverse effects on the environment, the need may arise for more in-depth environmental documentation.

Projects would be designed to minimize impacts within the corridor. Many of the proposed improvements within the Coast Corridor would be contained within existing right-of-way and would have minimal adverse environmental impacts. Some improvements would potentially have adverse impacts associated with widening and extending crossings at creeks and streams. Crossings would potentially impact riparian areas and sensitive biological habitats. Other biological affects from the improvements include potential impacts to coastal scrub habitat and oak woodland impacts. There are also several improvements that would be within the Coastal Zone.

There could also be potential direct and indirect impacts to parks, recreational facilities, and cultural resources such as historic and archaeological sites. Direct impacts may include acquisition while indirect impacts include noise and visual impacts.

Several of the improvements would result in impacts on agricultural land, including access to agricultural operations and division of farmland.

Improvements could require relocation of a quarry and hazardous materials remediation. Other constraints faced by many of the improvements include seismically active areas and soils.

Several of the improvements would be in close proximity to urban and residential areas that may result in direct and indirect impacts. Some of the impacts to communities and schools include traffic effects during construction and operation, increased noise levels and vibration, and visual impacts. Some improvements would also result in impacts to truck access, access to industrial properties, and local streets. Other potential impacts of the improvements include impacts on water quality due to erosion and storm run-off.

Improvements within this corridor would require coordination/permits from the California Public Utilities Commission, California Coastal Commission, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, California Department of Fish and Game, State Historic Preservation Officer, U.S. Department of Defense and U.S. Department of the Interior.

# Results of the Plan

This planning effort used stakeholder outreach, ridership modeling tools and technical operational and engineering analysis to develop the appropriate train frequencies, travel times, operational reliability and the supporting infrastructure improvements required to meet the demand for service in the Coast Corridor.

The plan calls for the immediate addition of one roundtrip between Los Angeles and downtown San Francisco and a second roundtrip as ridership demand grows. Annual ridership would grow to more than 415,000. The 20-year plan identifies $927 million for infrastructure improvements and additional rolling stock. This investment would have significant benefits to Caltrain service, with over $400 million planned for the San Jose to San Francisco corridor. In addition, it would allow for implementation of the Monterey-San Francisco service as well as Hollister commuter service.

### TRAIN FREQUENCY AND TRAVEL TIME

In order to attain the service objectives of the 20-year plan, which are market-driven and based on ridership analysis, it was necessary to develop infrastructure improvements that would function as a cohesive whole rather than as a group of disjointed projects. Therefore, the customer would have a reliable daily service. As a result, this unified set of infrastructure improvements would allow passenger trains to offer a marketable schedule that would appeal to a broader segment of travelers.

Implementing the 20-year plan would reduce the running time between Los Angeles and San Francisco to slightly over eight hours, a 30-percent decrease.

With Amtrak, UPRR, Metrolink and Caltrain trains on the Coast Corridor, it is essential that the projects proposed in the 20-year plan be implemented to meet future service goals. Several immediate projects, such as the San Jose (Tamien) to Gilroy Second Main Track (CO-01) and the Gilroy San Luis Obispo Track Upgrades (CO-02) would serve to increase capacity and improve operational reliability on the corridor. Near-term projects, such as the Cuesta Second Main Line Track (CO-13) would enhance the existing infrastructure such that additional capacity is created and additional trains can be run.

#### OPERATIONAL RELIABILITY

The 20-year plan identifies a blueprint of improvements that allow passenger and freight providers to consistently adhere to schedules and to reliably deliver the expected level of service. The limitations of the infrastructure in place require scheduling passenger trains to include excessive recovery time to compensate for these deficiencies. This is especially important along the mixed-use Coast Corridor, where different types and classes of trains must compete with each other for operating windows. The challenges presented by the physical characteristics of the route with long distances between passing sidings have hindered the development of consistent schedules within the framework of current service schedules. The investments in the 20-year plan would address and overcome these deficiencies so that schedules can be developed and reliably operated.

# GLOSSARY

**Active Warning Equipment:** Flashers and gates that are activated by the presence of a train.

**Advance Warning Signals:** A sign used along a roadway to warn that a roadway-rail grade crossing is ahead.

**Aquifer:** An underground geological formation containing usable amounts of groundwater that can supply wells and springs.

**At-Grade Crossing:** The surface where the railroad and a roadway (or pathway) cross at the same level.

**Ballast:** Material, usually crushed rock, placed on the roadbed to support the track structures.

**Bent:** The transverse framework that supports the superstructure of two bridges.

**Bypass:** A track that goes around other rail facilities (bypasses them). A bypass may be as simple as a track that goes around a small yard, or may be as significant as a complete route revision.

**Capacity:** The maximum number of trains that can be typically operated in a given section of track.

**Capital Costs:** Nonrecurring costs required to construct (or improve) the rail line. Capital costs include the purchase of vehicles, track improvements, station rehabilitation, and design and administrative costs associated with these improvements.

**Centralized Traffic Control (CTC):** A system that uses remote controls to change signals and switches along a designated portion of railroad track.

**Chokepoint:** An area along the railroad track that is often congested, making it difficult for trains to pass uninterrupted.

**Class of Track:** FRA defined designation of the track structure based upon track tolerances. Each class of track has an assigned maximum train operating speed.

| Class of track | Passenger Speed |
|---|---|
| FRA 4 | 79 mph |
| FRA 5 | 90 mph |
| FRA 6 | 110 mph |

**Circuitous Routing:** Movement of a train along a route that is not the most direct route between the train's origin and the destination.

**Commuter Rail:** Operates between a central city and its suburbs, and runs on a railroad right-of-way. Examples include Metrolink in Southern California and Caltrain in the San Francisco Bay Area.

**Consist:** The number and type of vehicles composing a train.

**Continuous Welded Rail (CWR):** Rails welded together to form a long solid segment at lengths of 400 feet or more.

**Control Point (CP):** A location where signals and/or other functions of a traffic (train) control system are controlled from the control machine (control center).

**Corridor Train:** Intercity rail passenger service that links major transportation centers within a limited geographic region.

**Crossover (and Power Crossover):** A set of turnouts that connects multiple tracks. A crossover allows a train to move from one track to another. A power crossover is controlled by CTC.

**Deficiencies:** Areas along the track that cannot handle expected increased train frequencies.

**Derail (and Power Derail):** A device on the tracks used to derail and stop a train from the tracks in case of an emergency. A power derail is operated by CTC.

**Diamond:** An at-grade railroad crossing, which looks somewhat like a diamond

**Dispatcher:** The individual who plans and controls the movement of trains.

**Double Track:** Two main line tracks located side by side, most often used for travel in opposite directions, like a two-way road.

**Environmental Assessment (EA):** An environmental analysis prepared pursuant to the National Environmental Policy Act (NEPA) to determine whether a federal action (or project with federal investment) would significantly affect the environment and, thus, require a more detailed Environmental Impact Statement (EIS).

**Environmental Impact Statement (EIS):** A document required by federal agencies under the National Environmental Policy Act (NEPA). An EIS is required for major projects or legislative proposals that may significantly affect the environment. A tool for decision-making, it describes the positive and negative effects of the undertaking and cites alternative actions.

**Exclusive Right-of-Way:** A right-of-way that is to be used only for the rail line (either freight or passenger or both).

**Fill Sections:** An embankment to support the track.

**Flashing Light Signals:** Used with the crossbuck signs at railroad crossings. When the lights are flashing, the motorist or pedestrian must stop.

**Floodplains:** The flat or nearly flat land along a river or stream in a tidal area that is covered by water during a flood.

**Freight railroad:** Railroad that transports freight (commodities) between two points.

**Frequency:** A term used to describe the level or regularity of rail service.

**Gates:** Used with flashing signals at certain crossings to warn that a train is approaching.

**Geometrics:** An engineering term that refers to the design of the tracks.

**Grade Crossing:** The area along the track where a roadway or pathway crosses.

**Grade-Separated:** Crossing lines of traffic that are vertically separated from each other (i.e., a roadway that goes over a railroad track).

**Groundwater:** Supply of fresh water found beneath the earth's surface, usually in aquifers, that supply wells and springs.

**Habitat:** The place where a population (human, animal, or plant) lives and its surroundings.

**Hazardous materials:** Material, often waste, that poses a threat to human health and/or the environment. Typical hazardous substances are toxic, corrosive, explosive, or chemically reactive.

**High-Speed Dispatching System:** A train dispatching system that performs train dispatching functions with pre-programmed logic. The train dispatcher monitors the system and only intervenes when necessary for special or extraordinary circumstances. Such a system provides faster and more accurate train dispatching decisions and therefore provides a greater level of safety for high-speed operations than is normally possible with human dispatching.

**Immediate project:** Improvement project designated for design and construction within the next two to three years (by 2003).

**Institutional impacts:** Impacts on organizations including: federal agencies and commissions, state agencies and commissions, regional agencies, local agencies and private-sector stakeholders such as freight railroads.

**Intercity rail:** Passenger service between cities provided by Amtrak.

**Intermodal:** The integration of different types of transportation modes to move freight shipments and people; i.e., ships, trains, buses, and trucks.

**Light Rail:** A type of urban rapid train. Light rail may share right-of-way on a roadway or operate on exclusive right-of-way, and can have multi-car trains or single cars. San Diego Trolley and Los Angeles's Metro Blue Line are examples of light rail.

**Liquefaction:** When a solid changes to a liquid. With some soils, this results in landslides.

**Lock switch (and Electric Lock Switch):** Operated by CTC to regulate when trains can enter on or off the tracks.

**Long distance (long haul) train:** A passenger train that serves major transportation centers within and beyond that of a corridor train. An example is Amtrak's *Coast Starlight* that travels between Los Angeles and Seattle.

**Main line (Main Track):** A railroad's primary track.

**Mass Transit:** Bus or rail transit system that carries a high volume of passenger.

**Mile Post (MP):** Location along the railroads main track from a defined starting point measured in miles.

**Mitigation:** Measures taken to reduce adverse impacts on the environment.

**National Pollution Elimination Discharge System (NPDES):** A provision of the Clean Water Act that prohibits discharge of pollution into waters of the United States unless a special permit is issued by the U.S. Environmental Protection Agency, a state agency, or, where delegated, a tribal government.

**Near-term Project:** Improvement project designated for design and construction within the next four to eight years (by 2008).

**Nonpoint Source:** Pollution sources without a single point of origin. The pollutants are generally carried off the land by stormwater.

**Operational reliability:** The extent to which the trains travel between two points within their defined operating schedule.

**Passive warning device:** Signs or markers used at all grade crossings that do not change whether a train is present or not.

**Pavement Markings:** Painted on the pavement in advance of a railroad highway crossing, it warns the motorist or pedestrian of the rail crossing.

**Positive Train Separation (PTS):** A train signal and control system that prevents trains from colliding.

**Rail Weight:** Weight of rail measured in pounds per linear yard.

**Rail Yard:** A system of tracks within defined limits that are designed for storing, cleaning, and assembling (to each other) rail cars.

**Railroad Crossbuck:** A type of sign found at all public railroad crossings. This sign should be treated as a yield sign.

**Railroad Tie:** A transverse support to which rails are fastened to keep them in line with, gage and grade. Usually wooden or concrete.

**Rapid Rail:** Is an electric railway, which carries a large volume of people on exclusive right-of-way. San Francisco's BART and Los Angeles's Metro Red Line are examples of rapid rail.

**Recharge Area:** A land area in which water reaches the zone of saturation from surface infiltration; e.g., where rainwater soaks through the earth to reach an aquifer.

**Reliability:** In transportation planning, if a train or bus arrives within ten minutes of its scheduled time, it is considered reliable. Reliability can be impacted by congestion on the tracks, delays at stations, and equipment malfunction.

**Ridership:** The number of people carried by the passenger train during a specified period.

**Right-of-way (ROW):** The property occupied by the rail service.

**Rolling Stock:** Locomotives and rail cars.

**Runoff:** That part of precipitation, snow melt, or irrigation water that runs off the land into streams or other surface water. It can carry pollutants from the air and land into receiving waters.

**Siding:** An auxiliary track located next to a main line that allows a train to move out of the way of an oncoming train. Sidings are also used to store trains or to add/subtract rail cars.

**Signal/communication systems:** A system that utilizes wayside or radio equipment to communicate.

**Stringline:** Graphical description of train performance showing the cumulative time versus distance line.

**Superelevation:** The height the outer rail raised above the inner or grade rail on curves to resist the centrifugal force of moving trains.

**Switch:** Common name for a turnout.

**Train performance calculator models:** Computerized train modeling programs which use a complex series of empirical formulas repeatedly iterated at user defined intervals to accurately simulate (replicate) the behavior of specific train configurations operating over a section of railroad whose alignment and profile and other operating constraints are defined.

**Trainset:** The set of vehicles in a train. A typical passenger trainset is one locomotive with one cab-control car, one café car and three coach cars.

**Travel (or Trip) time:** The elapsed time between a trip's beginning and end. It includes travel, transfers, and waiting time.

**Turnout (switch):** A specialized section of the track that allows a train to change from one track to another.

**Vision Project:** Improvement project designated for design and construction within the next nine to twenty years (by 2020).

**Wetland:** An area saturated by surface or groundwater with vegetation adopted for life under those soil conditions. Examples of wetlands are swamps, bogs, and estuaries.

# ACRONYMS

| | |
|---|---|
| **ACE** | Altamont Commuter Express |
| **ABS** | Automatic Block Signals |
| **Amtrak** | National Railroad Passenger Corporation |
| **ATS** | Automatic Train Stop System |
| **BART** | Bay Area Rapid Transit District |
| **BNSF** | The Burlington Northern & Santa Fe Railway |
| **BP** | British Petroleum |
| **CA HSRA** | California High-Speed Rail Authority |
| **Caltrans** | California Department of Transportation |
| **CCJPA** | Capitol Corridor Joint Powers Authority |
| **CEQA** | California Environmental Quality Act |
| **CMAQ** | Congestion Mitigation and Air Quality Improvement Program |
| **CP** | Control Point |
| **CRCC** | Coast Rail Coordinating Council |
| **CTC** | California Transportation Commission |
| **CTC** | Centralized Traffic Control |
| **CWR** | Continuous Welded Rail |
| **DPG** | Deck Plate Girder |
| **DT** | Double Track |
| **EA** | Environmental Assessment |
| **EIR** | Environmental Impact Report |
| **EIS** | Environmental Impact Statement |
| **FRA** | Federal Railroad Administration |
| **FFY** | Federal Fiscal Year |
| **I-80** | Interstate 80 |

| | |
|---|---|
| **LAUS** | Los Angeles Union Station |
| **LD** | Long-distance |
| **LRT** | Light-Rail Transit |
| **ML** | Metrolink |
| **MP** | Mile Post |
| **mph** | miles per hour |
| **MPO** | Metropolitan Planning Organization |
| **MTA** | Metropolitan Transportation Authority (Los Angeles County) |
| **MTC** | Metropolitan Transportation Commission (San Francisco Bay Area) |
| **MTDB** | Metropolitan Transit Development Board |
| **NA** | Not Available |
| **NCTD** | North County Transit District |
| **NEPA** | National Environmental Policy Act |
| **NHS** | National Highway System |
| **No.** | Number |
| **PCJPB** | Peninsula Corridor Joint Powers Board (Caltrain) |
| **PTS** | Positive Train Separation |
| **ROW** | Right-of-way |
| **RTC** | Rail Traffic Controller |
| **RTPA** | Regional Transportation Planning Agency |
| **SamTrans** | San Mateo County Transit District |
| **SCIRG** | Southern California Intercity Rail Group |
| **SCRRA** | Southern California Regional Rail Authority |
| **SCVTA** | Santa Clara Valley Transportation Authority |
| **SDNR** | San Diego Northern Railway |
| **SJVRC** | San Joaquin Valley Rail Committee |
| **SPRR** | Southern Pacific Transportation |

| | |
|---|---|
| **STIP** | State Transportation Improvement Program |
| **STP** | Surface Transportation Program |
| **TAMC** | Transportation Agency for Monterey County |
| **TCS** | Traffic Control System |
| **TPC** | Train Performance Calculator |
| **TPG** | Through Plate Girder |
| **TVM** | Ticket Vending Machine |
| **UPRR** | Union Pacific Railroad |
| **VTA** | Santa Clara Valley Transportation Authority |

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